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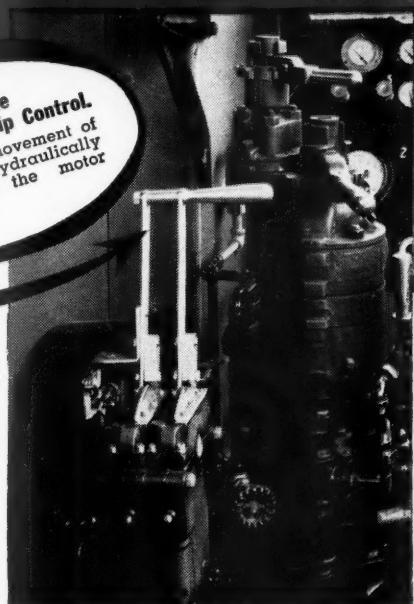
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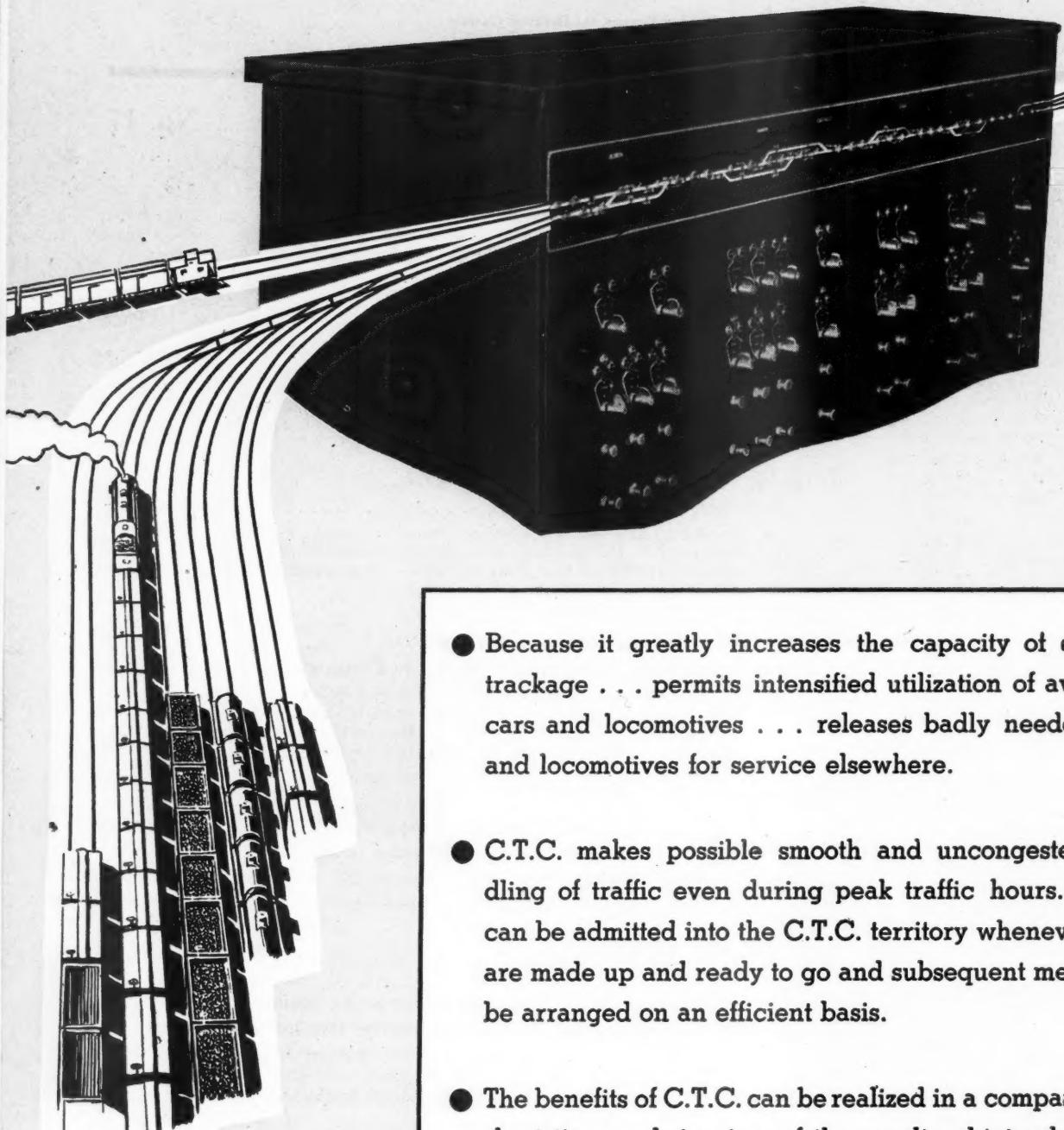
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The Week at a Glance

DECADE OF STREAMLINERS: A large part of this issue is devoted by *Railway Age* and its advertisers to the first decade of the streamliners." It was just 10 years ago this month that there appeared trains upon the railways—one on the Union Pacific, the other on the Burlington—that differed from all preceding trains that immediately aroused nationwide, and even international, interest and curiosity. And with them came the beginning of the great struggle between steam and Diesel-electric locomotives for supremacy. Recalling how this enterprise brightened the depression's darkest skies, the leading editorial appraises it as perhaps the most significant business event of the time. For the appearance of the streamliners and their sensational success as money makers and traffic retrievers did much toward changing that defeatist business and public sentiment to which continuance of the depression was largely due.

TOMORROW: The wartime interruption of what had been the streamliners' continued progress up to 1942 is viewed as merely a pause. So the editorial looks into the future and finds it bright, predicting for the post-war period (or sooner if restrictions are lifted) a steady increase in the number of streamlined trains, and a rapid substitution of improved passenger cars and locomotives for equipment that the streamliners have made obsolete. The railroads owe their post-war prospects for retaining a larger part of the country's passenger traffic than they had before the war to the great improvements in equipment and service which they and the manufacturers have made during the "decade of the streamliners."

ROLL CALL: The triumph of the streamliners is highlighted in the leading feature article which begins on page 762. The article reviews the epochal development which in ten years has changed the nation's travel habits. Also it points out how fixed structures have kept pace. And it calls the roll of railroads which have thus far been the architects of this revolution in railway passenger service. There are 30 of them—from Alton to Union Pacific.

THE CARS: Developments in car equipment for streamlined trains are traced in the article beginning on page 770. It tells of the new materials and spectacular innovations in design which have captured the public fancy and refuted more thoroughly than ever the old canard that railroads are hidebound, non-progressive and slow to accept new ideas. Designers and builders were given almost carte blanche to produce cars which would achieve the objectives of increased passenger traffic and public goodwill.

THE MOTIVE POWER: The changes in passenger-car construction and standards of passenger-train service which the streamliners introduced have, in turn, exerted a marked influence on the trend of development of passenger-train motive power. The article beginning on page 776 tells all about

this. Among other things, it points out how the new trains have demonstrated the importance of a high horsepower-weight ratio; promoted the rapid development of the unit capacity of Diesels; and accelerated the utilization of steam motive power.

ADMINISTRATIVE REVAMP: Director Johnson has followed through from his recent appointment of Homer King as executive assistant to make further changes in O. D. T.'s top administrative set-up. Henry McCarthy and Guy Richardson have become assistant directors, the former with supervision over the Division of Railway Transport as well as the Division of Traffic Movement which he had previously headed. Mr. Richardson likewise retains supervision over the Division of Local Transport and gets the Division of Motor Transport in addition. Resignations include those of Assistant Director John Rogers, who will return on a full-time basis to the I. C. C.; Acting Director James Aydelott of the Division of Railway Transport, who goes back to the Burlington; and Director Otto Beyer of the Division of Transport Personnel.

LOPSIDED PLANNING: There is no "chicken or egg" dilemma about which one of the nation's transportation agencies "came first"—or still comes first in meeting basic transportation needs. If an attempt were made to shift the freight now being moved by rail to the air or to the highways, the country would have precious little wherewithal in human or material resources left over to wage war. And in time of peace, too, efficient railroad service is needed to keep planes in the air and motor vehicles on the highways. Thus does one of this issue's editorials lay the groundwork for its examination of current transport "planning" in Washington. It finds the "planners" much concerned about the future of air and highway transport, while they give no thought to the railroad outlook—perhaps because ample railroad facilities have always been provided by private enterprise.

RECKLESS ASSUMPTION: But it is rather reckless to assume that private enterprise will always be able, regardless of circumstances, to carry on needed development of the railways, which can only be done for other forms of transport by infinite legislative labor and governmental expense. There is one sure gage of the ability and inclinations of private investors—the price at which the stock of an industry is selling. The Dow-Jones index of railroad stock prices ranged from 80 to almost 190 in the 1923-1929 period when there occurred the intensive railroad development which put the industry in readiness to carry the present burden of war traffic. The index is now approximately 40—a fact upon which the political sentinels of the nation's welfare might pause to reflect, if they can spare a few moments from appropriating and planning for railroad competitors.

WAR BABY: Air express traffic will be difficult to maintain at the present volume when the government is no longer the big shipper, ready and willing to pay the rates. Such is the finding of Brigadier General Leonard P. Ayres who has made a survey for the Chesapeake & Ohio. Cost is uppermost in the minds of commercial shippers; and while the survey indicated that a majority will use post-war air freight or express services, 40 per cent will not.

HENDERSON MEDALIST: Joseph B. Ennis, senior vice-president of the American Locomotive Company, this week received from the Franklin Institute the George R. Henderson Medal, awarded for meritorious service or discoveries in the field of railway engineering. The Ennis citation reads: "In consideration of his accomplishments in locomotive engineering and important contributions in the field of locomotive design."

SHOW-CAUSE ORDER: Railroads have been called upon by the I. C. C. to show cause by May 8 why the suspension of the Ex Parte 148 freight rate increases should not be continued for another six months—to January 1, 1945. A similar call in October, 1943, brought no railroad objection to the present six-months extension beyond the original expiration date of January 1, 1944. Recently, however, some executives have been advocating a lifting of the suspension in view of the downward trend in net earnings which has persisted for several months.

TAILOR-MADE BRIDGE: In planning the new reinforced-concrete highway bridge over its tracks at Aberdeen, Md., the Pennsylvania had to devise a pattern which would fit various conditions at the site while at the same time minimizing the use of critical materials. The result is a structure embodying innovations in both design and construction, including the main span's center portion which consists of a concrete slab suspended from cantilever arms projecting from rigid-frame end spans. Noteworthy among the construction methods was the placing of the concrete for this suspended section in a form hung from beams spanning between the cantilever arms. The project is described in an illustrated feature article herein.

C. T. C. HELPS HELPERS: The Frisco's line between St. Louis, Mo., and Springfield crosses the Ozarks on heavy grades and sharp curves which limit speeds and require helper locomotive service for through freight trains and passenger trains of more than 10 cars. Timetable and train order operation, with automatic block signals and hand-throw switches, worked satisfactorily until wartime traffic brought excessive train delays, caused in large part by waits for helpers which found little opportunity to get back over the congested line to their starting points. How the situation has been relieved by the installation of centralized traffic control on the 47-mile stretch between Dillon, Mo., and Swedeborg is told in one of this issue's feature articles.

Dear Friend:

There is not much left on this roll of Okonite Manson Tape but I have been peeling a little off this roll for 25 years and I thought that you might like to hear what happens to Okonite Tape. This roll has been in my possession since 1917. I have the original tin box and always keep the tape in it and the little bit that is left is still good. I thought you might like to have it for a souvenir.

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RAILWAY AGE

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1934—Decade of the Streamliners—1944

The most significant business event of the depression, perhaps, was the appearance in the early part of 1934 of the streamlined, light-weight passenger train. A large part of this issue is devoted by *Railway Age* and its advertisers to the first "decade of the streamliners."

The first appearance of the streamliners was so significant because of the conditions existing at the time, and of their influence in helping change the defeatist business and public sentiment to which continuance of those conditions was largely due. The country was still near the bottom of the worst depression in its history. Business had improved little since a year before when all the banks had had to be closed to prevent a complete collapse. In that preceding year the railways' passenger traffic had been two-thirds smaller than in 1920, and, in fact, the smallest since 1900. Owing to competition by highway, it had declined steadily during the prosperous 20's and then, owing to the depression, had dropped so precipitately that they seemed in danger of losing all of it. The railways were being widely characterized as a "decadent" industry for which the nation soon would have no further use.

But throughout the very year of extreme depression following the closing of all the banks, the managements of some railways and manufacturing companies were venturing millions of capital in designing and building the most revolutionary means of mass passenger transportation ever put into service. With little previous announcement, but with plenty of accompanying publicity, there appeared trains upon the railways—one on the Union Pacific, the other on the Burlington—that so differed from all preceding trains in their looks, in their motive power, in the materials of which they were constructed, in the design, weight, accommodations and comfort of their cars, that they immediately aroused nationwide, and even international, interest and curiosity. It was just ten years ago this month that the first passenger train equipped with a Diesel-electric locomotive was delivered; and the great struggle between steam and Diesel-electric locomotives for supremacy began.

These developments caused a sensation at the time. Anybody who doubts or cannot recall the sensation caused can verify it by reviewing the 1934 and 1935 files of the newspapers. The exhibition runs of the earliest streamlined trains attracted crowds everywhere they stopped, and at many places along the rights of way where they did not stop.

The results of their installation speedily became substantial as well as sensational. The number of railways acquiring them increased rapidly. They were soon providing in all parts of the country with safety and comfort the fastest land transportation the world had ever known. They began making money themselves and helping change the general trend of railway passenger earnings from downward to upward. They contributed more than anything else before the war to convincing the public that the railways were still an aggressive, progressive industry. For press and public did not fail to note that this so-called "decadent" industry was showing more initiative and courage in a period of depression and defeatism than any other American industry.

The progress of the streamliners continued and accelerated until war made it necessary in 1942 to discontinue the building of passenger locomotives and cars, and to mingle the equipment of many former streamline trains with older standard equipment in order to enable

Efficiency
FOR VICTORY

the railways to perform the necessary but unglamorous service of handling the nation's enormously increased wartime civilian and military traffic.

One of the most important postwar developments on the railways will be revival of the increase in the number of high-speed streamlined trains, and of the rapid substitution of improved passenger locomotives and cars for the great amount of passenger equipment that the streamliners have made obsolete. In fact, this development will revive during the war when in the near future the building of a restricted amount of new passenger equipment will be permitted.

In the postwar period the railways will again be confronted with the challenging competition of other passenger carriers. The challenge of the buses probably will be less serious than before the war; the challenge of the private automobile as serious as formerly; that of the aeroplane more serious, especially for long distances. The prospect is, nevertheless, that the railways will be able to retain a larger part of the country's passenger traffic than they had before the war; and they owe this prospect to the great improvements in equipment and service that they and the manufacturers have made during the "decade of streamliners."

Postwar Speeds Will Require Stabilization of Roadbeds

As we recognize the tenth anniversary of the streamlined train in this issue, it is not out of place to consider at what speeds postwar streamlined trains will operate, for it is certain that the running time of many of today's trains will be shortened materially to meet competition and to hold passenger traffic. Speeds as high as consistent with safety of operation are to be expected and the ultimate limiting factor, other than economy of operation, will be the track.

For these higher speeds, further refinements in track maintenance will be required, together with a vast expansion of the program of reducing curvature. These further refinements in track maintenance will require a stabilized roadbed; otherwise the cost of maintaining the track surface will become excessive. For years, maintenance engineers have recognized that their principal enemy is water and have subscribed to the statement of a prominent chief engineer "that the three essentials of good track are drainage, more drainage and still more drainage." The problem includes surface drainage, clean ballast and subdrainage.

Ditching to provide surface drainage is normally a relatively simple problem but requires constant vigilance. In recent years, many roads have utilized modern self-propelled off-track grading and ditching equipment to widen cuts and place the cut ditches further from the track. Right-of-way surface ditches have also been cleaned and enlarged to prevent surface water from reaching the vicinity of the track and penetrating the roadbed.

The frequency with which ballast cleaning or reballasting may be required depends upon many factors,

including the amount of mud and water drawn up from the subgrade and the volume of foreign matter, such as cinders or coal dust and other lading from cars, deposited upon the track. Machines have been developed for cleaning stone and clay ballast at the ends of the ties and in the intertrack spaces. For other types of ballast, scarifying and discing machines have been developed which help keep down weed growth on the shoulders as well as promote drainage.

All of these methods are of little avail, however, with track carried on an unstable roadbed due to poor soil or faulty embankment construction. Much has been learned in recent years about the compaction of soils, the mixture of soils and the proper moisture content for maximum compaction. With modern grading methods and grading specifications requiring compaction, new embankments undergo little, if any, settlement. Unfortunately, however, most of the existing lines were constructed without much attention to such details and many miles of track are carried on soft unstable roadbed that is marked with water pockets which have developed over many years.

One method of curing unstable roadbed is the installation of subdrainage. Subdrainage has been employed for many years with varying degrees of success, first in the form of French drains, later with tile pipe drainage systems, and more recently with perforated corrugated steel pipe. To be successful, subdrainage must do one or both of two things; it must intercept water from outside sources to prevent it from getting into or under the track and it must remove all the water in the water pockets under the track. An adequate system of subdrainage may be expensive but the cost is usually repaid many times over in reduced maintenance. Less than adequate systems are usually only temporary stop-gaps.

More recently another method of combating unstable roadbed has been tried—the grouting of the sub-ballast or the roadbed to provide a stable bearing for the track. This method has been used in test installations on a number of roads.

In addition, recent developments, as yet untried by the railroads, but which appear to have possibilities for the stabilization of new roadbed, include the use of soil-cement mixtures to seal the surface and prevent the entrance of water. This method has been used by roadbuilders and military forces to obtain a waterproof surface of surprising strength at reasonable cost. Still another recent development is the use of powdered resins, both synthetic and natural, one of which is derived from waste liquor in rayon manufacture; these are said to keep the soil dry and are reported to have been used successfully in road building. Unlike soil-cement mixtures, they are reported to be most successful with heavy clay soils and unsuccessful with sand.

Whatever the method adopted, railway maintenance engineers are facing the necessity of considering roadbed stabilization as one of the prime essentials of postwar track if the ultimate possibilities of high-speed traffic are to be exploited after the war.

Lopsided Transport Planning

There is no "chicken or egg" dilemma about which one of this nation's transportation agencies "came first"—or still comes first in meeting basic transportation needs. It is no derogation from the plane's high merit in some specialized kinds of transport to call attention to its inability even to haul the raw materials to supply the airplane manufacturing industry.

No well-informed American would deprecate the contribution of motor vehicles and the automotive industry, both to the great improvement of the country's transportation service, and to America's military strength. Yet motor vehicles could not haul the freight now being moved by rail for less than three or four times the present cost—with a proportionately increased call on the nation's industrial output and its manpower.

If the attempt were made to shift the freight now being moved by rail to the air or to the highways, the country would have precious little wherewithal in human or material resources left over with which to wage war. In time of peace, as well as war, efficient railroad service is needed to keep the planes in the air and motor vehicles on the highways (at least, in anything like their present quantity).

Official Washington is seething with activity and discussion of plans for further development of highways and aviation (to say nothing of purely parasitic inland waterways), but it gives no thought at all to the outlook for the railroads. Rather illogical, isn't it, in view of the primary national interest in continued efficient railroad service—not only from a military standpoint, but even to provide the means whereby other forms of transport may enjoy healthy growth?

Perhaps this neglect arises from the fact that provision of highways and airways has been assumed as a governmental function, whereas—so far—ample railway facilities have always been provided by private enterprise. All the same, it is a rather reckless assumption to conclude that private enterprise and investment will always be able, regardless of circumstances, to carry on needed development of the railways, which can only be done for other forms of transport by infinite legislative labor and governmental expense.

There is one sure gage of the ability and willingness of private investors to pursue the further large-scale development of any industry, and that is the price at which the stock of that industry is selling. In the years 1923-1929 when the intensive railroad development occurred which put the industry in readiness to carry the present burden of war traffic, the price of railroad stocks ranged from 80 to almost 190 on the Dow-Jones index. Their current price is approximately 40—a fact upon which the political sentinels of the nation's economic and military welfare might pause to reflect, if they can spare a few moments from appropriating and planning for the expansion of competing transportation agencies.

Uncle Sam's transportation dietitians, it appears,

are going to give him all the fancy desserts and salads they can contrive—and take a long chance that, somehow, Providence or luck will provide the staple groceries to sustain his vigor.

Training in Lieu of Deferment

The announcement of Selective Service that deferments of railway men under 26 years of age will be confined to those in activities directly related to "the movement of war freight vital to immediate war objectives and certain other railway personnel," offers the railways little relief for the man shortage problem because the men under 26 who are left on the railroads and subject to draft comprise a very small percentage of their total needs. The 250,000 men who have already been taken from the railroads for military service will not be affected, while only a few of the 50,000 additional men who will be called within the next few months will be deferred. Persons desiring to enter railway service are not mentioned in the announcement as being entitled to deferment and this therefore offers no solution to the labor problem which, on March 1, involved a recorded shortage of 101,000 men.

The fact that very little relief can be expected from the deferment plan as announced is indicated by a study of the personnel of a railway which employs some 26,000 persons. Of these employees, 456 are under 26 years of age, of whom 312 are between the ages of 22 and 26. Of the 312, only 29 can be classified as "vital to immediate war objectives" and thus subject to possible deferment. In addition, this railroad has 794 employees who, because they are between the ages of 26 and 30, are still subject to draft. The unfilled labor needs of this railroad stand at 1,700 persons.

Because the deferment plan offers little relief from the drafting of men whose work requires experience, the railroads are now confronted with the added necessity of substituting methods of training which will quickly familiarize a new employee with his duties and enable him to assume responsibilities without the usual lengthy apprenticeship. Effective training courses are not usually adapted to old procedures, and consequently the railroads may find it necessary to adjust old arrangements to modern methods of training.

In the past, the railroads have been able to pair new employees with older ones and let the new ones secure their knowledge from the experienced ones. However, even if the old employee was willing and had the patience to train the new recruit, the training was of long duration and its effectiveness depended to a great extent upon the ability of the older worker to instruct and upon the ability of the new one to ferret out knowledge. With the manpower shortage becoming more critical, training becomes vital. The problem of the railroads is to develop methods of training that will transform raw material into responsible employees in weeks instead of months or years.

Decade of the Streamliners

In ten years, these new trains have changed the nation's travel habits

THIS issue of *Railway Age* is devoted especially to reviewing one of the most epochal developments in the history of American railways — viz., the development of the streamlined lightweight passenger train, which began just a decade ago. One train of this kind was delivered in February, 1934, to the Union Pacific by Pullman - Standard Car Manufacturing Company, and was powered with a gasoline distillate engine. Another was delivered in April, 1934, to the Burlington by the Edward G. Budd Manufacturing Company, and was the first train powered with a Diesel-electric locomotive which was built by the Electro-Motive Company. Thus in the depth of the depression, the railways began gambling millions of dollars on the fickle public taste—and won.

The last ten years have demonstrated beyond any question the popular appeal of streamlined trains. More than that, the courageous action of the railways in beginning to put them in service in a period of nationwide defeatism marked an upward turning of the tide of national productivity and prosperity which was more than co-incidental. The very word "streamlined" took on an entirely new meaning in that it no longer remained a technical term in aerodynamics, but became a household word for efficiency and modernity, until it is now coupled with an entire gamut of improvements from "streamlined trains" to "streamlined morticians' parlors." The word became a rallying cry which helped the nation lift itself out of the worst depression in history.

Outstanding Passenger Appeal

The appeal of the new trains struck the chord of public interest and enthusiasm at once. Granted that much astute and clever publicity was turned out to aid in this, there still remains the fact that the trains themselves had an unprecedented appeal. When the M-10,000 of the Union Pacific was put on display in Washington soon after it was delivered, governmental activities were largely suspended for a day while dignitaries, from the President down, filed through the new train. Similarly, some weeks later, a crowd of more than a thousand people stood on a mesa at dawn in a sparsely populated section of Colorado to watch the first Burlington Zephyr go by on its memorable non-stop run from Denver to the Century of Progress exposition at Chicago. Before and after these instances, every



One of the Fleet of Burlington "Zephyrs"

public showing of such trains, as they increased in number on various railways, brought forth thousands of people who stood patiently in line waiting their turn to pass through them.

The new trains had "color" in both the literal and the figurative senses, and, from the start, not only attracted public attention, but also attracted public patronage at the ticket windows. They supplied a sadly-needed "shot in the arm" to declining railway passenger revenues. When streamliners were put on runs that formerly showed most anemic returns, the revenue per train mile promptly doubled or trebled. For the first time in many years, the words "sold out" re-entered the ticket clerk's vocabulary. It should not be forgotten today that, in the depth of the depression, when other trains were struggling to break even, the streamliners were earning from three to six dollars a train mile. This is a most satisfactory peacetime figure, even though, today, many of these trains are earning as much as ten to fifteen dollars per train mile under the abnormal wartime travel conditions.

Only one of these trains went into revenue service in 1934, but by the end of 1935, no less than 14 streamliners were operating on 10 different railways. The procession continued at an accelerated pace until by December, 1939, at the end of five years of streamlined operation, there were 53 streamliners in operation on 16 different railways. The following year, 1940, saw this fleet augmented by 32 new trains, bringing the total to 85, operated by 21 railways. In 1941, 34 more trains brought the total to 119 and the number of railways on which streamlined service was available to 29. With our entrance into the war in the closing days of 1941, the ordering of new trains of this character ceased. At the time this action was taken, a number of streamliners were in the course of construction and this eventually added 14 more trains, which would have brought the total to 143 trains, excepting for the fact that, mean-

time, the necessity for greater wartime utilization of locomotives and cars had resulted in many of these trains being run with a partial consist of standard equipment.

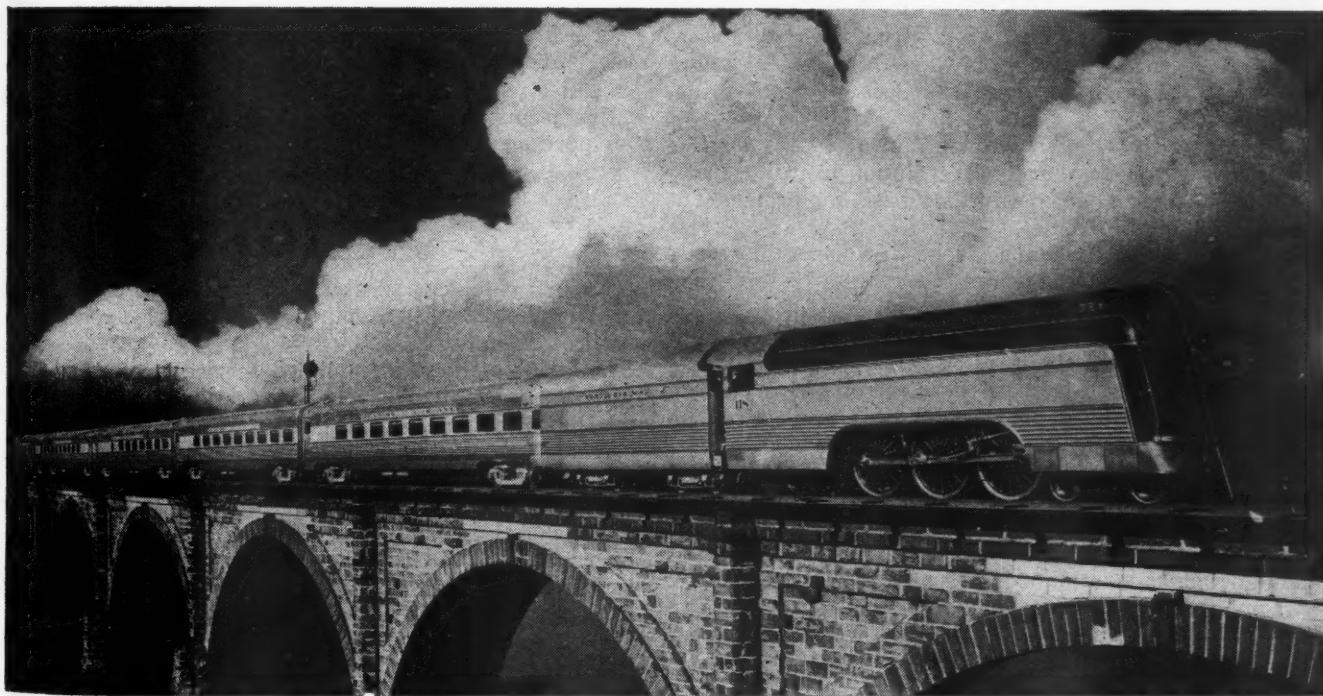
During the war, the streamliners of the country have been devoted to strictly utilitarian purposes. Their identity is being maintained, but many of them are on runs where operating efficiency and maximum car utilization dictate that they can no longer consist entirely of lightweight, streamlined equipment. Tourist sleepers and archaic day-coaches are quite likely to be found on many of the streamliners, if the extraordinary task of handling the country's unprecedented wartime traffic requires it.

Nonetheless, the war has not changed the public preference for the streamliner. The *Railway Age* recently conducted an informal study of passenger traffic between two cities approximately 500 miles apart, which are served by reasonably fast trains on three railways. One of the lines operates a fast day streamliner between the two points and this train is now earning as much (or more) per mile as any other train in the country. Some 70 per cent of its traffic regularly consists of military personnel. Questioning a cross-section of the passengers using all of the trains between these two points, both civilians and members of the armed forces, brought out the fact that more than 60 per cent of the coach passengers preferred to ride the streamliners,

for many years, in prosperous times as well as bad times. Soon their efforts were being felt increasingly in many other phases of the railway passenger business, and archaic promotion and sales efforts were being increasingly supplanted by clever and effective sales promotion and advertising campaigns. The war, and the attendant necessity for urging passengers to stay off the trains, put a stop to this, of course, but it is only a temporary halt. The postwar period will see many more streamliners and many more effective ways of merchandising railway passenger travel.

Fixed Structures Kept Pace

To make all this possible, improvements have been required in many elements of the fixed properties of the railways. The routes of the new streamliners have had to be brought to new standards of safety and comfort. Hundreds of curves have had to be reduced in degree—others have had to be realigned and spiraled, and hundreds of miles of tracks have had to be strengthened with new rail, new track fastenings, new ballast, new ties and better drainage, and refined throughout with regard to line, gage and surface. At the same time, many long-time standard methods of conducting work have had to be modified or completely revised to prevent slow orders or other restrictions on the operation of these "Queens of the Rails."



The Reading's "Crusader"

regardless of its terrifically overloaded condition and of the possibility that they might have to stand all the way, rather than ride in reasonable comfort on other trains. War or no war, the streamliners are and will remain the glamour trains of the country. With their color, speed and peacetime comfort and luxury, they supply the only answer yet devised to the intense competition for the travel dollar which is sure to develop after the war.

These trains supplied passenger men with a potent weapon for the discouraging struggle against sharply declining passenger revenues that had been going on

But this has not been enough. The higher speeds and faster overall schedules of the streamliners have required the modification or extension of hundreds of miles of signaling on the routes involved, in the interest of both safety and the efficiency operation of other slower trains; sidings have had to be built or relocated; new high-speed turnouts have had to be installed; and new streamliner watering, fueling and general servicing facilities have had to be provided, along with new shop layouts for the inspection and repair of the newer types of power being employed. In fact, many of these improvements were as essential to the initial service

runs of the new streamliners as the fuel tanks on the new units themselves. This work has had to be done, and, in spite of the difficulties of the times, it has been done, insuring a degree of safety, comfort, speed and on-time performance of the new trains that could not have been possible otherwise.

A Story of Achievement

At the same time, with the advent of the streamliners, the railways have become increasingly conscious of the lack of harmony between many of their passenger stations and the new mode of travel, and immediately initiated projects of station modernization which, in some instances, produced facilities as colorful and streamlined as the trains they serve. Soon this trend extended over into the streamlining of uptown and off-line ticket offices, and was well on its way toward general acceptance as a vital part in the picture of revitalized rail transportation, when such work was practically brought to a standstill by the war shortages of essential materials. Largely increased attention to railway passenger stations is due, if not long overdue, and is certain to form a prominent phase of railway postwar activity.

In the following pages, the history of the streamlined trains and the use of lightweight equipment on other trains are traced in detail. Many of the railways mentioned, as well as others, have also made remarkable strides in the use of modernized or rebuilt trains, which have been thoroughly described in other issues of the *Railway Age*. However, in celebrating a decade of streamliners in this issue, only new streamlined equipment is considered, and with emphasis on trains rather than cars.

The record of the individual railways, as shown in the following pages, depicts a revolution in railway passenger business. It also affords a basis for prophecy as to better things to come.

Alton: The Abraham Lincoln was placed in service between St. Louis and Chicago on July 1, 1935, and the Ann Rutledge was inaugurated as a companion train on July 26, 1937. Until the war, these trains consisted entirely of lightweight streamlined equipment and the Ann Rutledge still does. For more efficient war transportation, standard equipment is now run on the Abraham Lincoln along with lightweight cars. These trains have consistently earned high revenues since their inauguration. However, as an example of their wartime earnings, in January, 1944, one of these trains averaged \$10.80 per train mile. The Alton owns 17 lightweight streamlined cars and two Diesel-electric streamlined passenger locomotives.

Atchison, Topeka & Santa Fe: While this company did not inaugurate streamlined service until June 15, 1937, it now operates an imposing fleet of 17 such trains, as follows:

Name of Train	No. of Trains
Super Chief	2
Chief	6
El Capitan	2
Chicagoan-Kansas Cityan	2
Tulsan	1
Golden Gate	2
San Diegan	2

17

In addition, the Scout and the California Limited regularly carrying lightweight streamlined cars as part of their consist between Chicago and Los Angeles, as does the Ranger between Chicago and Kansas City.

The Santa Fe now owns 166 lightweight streamlined cars, and 90 lightweight sleeping cars are also assigned to it in regular service. One streamlined steam locomotive is owned, as well as 24 Diesel-electric streamlined locomotives, of which 13 are of 1,800 h.p., and 11 of 2,000 h.p.

By means of the Super Chief, the Chief and the El Capitan, the Santa Fe supplies three distinct classes of service between Chicago and Los Angeles; high-speed all-Pullman; fast speed, all-Pullman; and high-speed, all coach. The Golden Gates, operated between Oakland, Calif., and Bakersfield, are unique in that they form a part of the only bus-streamliner-bus co-ordinated service in the country, thus serving as a through route between San Francisco and Los Angeles.

The Chicagoan and the Kansas Cityan, originally intended for Chicago-Kansas City service only, were soon extended to serve Wichita, Kan., and some months later were further extended to Oklahoma City, while the Tulsan was established between Kansas City and Tulsa as a close connection of the other two trains to give another section of Oklahoma the benefit of streamlined service.

Atlanta, Birmingham & Coast: As an intermediate carrier, this line participates in the operation of the Dixie Flagler. This Chicago-Florida streamliner operates over the A. B. & C. between Atlanta, Ga., and Waycross.

Atlantic Coast Line: This railway began streamline train operations in December, 1939, when the New York-Miami Champion was inaugurated. A few weeks later, three more trains were added when the Chicago-Miami streamliners were put in service. All of these latter trains use the A. C. L. as an intermediate line for portions of their journey, as follows:

South Wind	Montgomery, Ala.	— Jacksonville, Fla.
Dixie Flagler	Waycross, Ga.	— Jacksonville, Fla.
City of Miami	Thomasville, Ga.	— Jacksonville, Fla.

The A. C. L. now owns 31 lightweight streamlined passenger cars, as well as 24 "A" units and 5 "B" units of Diesel-electric streamlined passenger locomotives, a total of 29 units.

All four of these streamlined services were originally intended almost exclusively for vacation travelers. With the conversion of Florida into a vast military training center, however, they have become potent factors in supplying the area with wartime transportation.

Boston & Maine: Since April 1, 1935, this line has been operating the Flying Yankee, a three-car streamliner with a "built-in" Diesel-electric power plant. Up to January 1, 1944, this train had made 1,494,071 miles in various services. Originally, it operated between Boston and Portland, Maine, and Bangor. For the last three years, however, it has been run between Boston and Portland in the winter, and rechristened the Mountaineer for the summer season and operated between Boston and Littleton, N. H., and Bethlehem.

Central of Georgia: This railway serves as an intermediate line for the Chicago-Florida Streamliner City of Miami, between Birmingham, Ala., and Thomasville, Ga.

Chicago & Eastern Illinois: This line operates the Dixie Flagler every third day between Chicago and Evansville, Ind., en route to Miami. The operation of this 7-car train was begun on December 17, 1940, and it has been practically sold out every trip in each direction since. The C. & E. I. also operates two lightweight streamlined rail motor cars.

Chicago & North Western: This railway has two distinct classes of streamliner service; first, the long

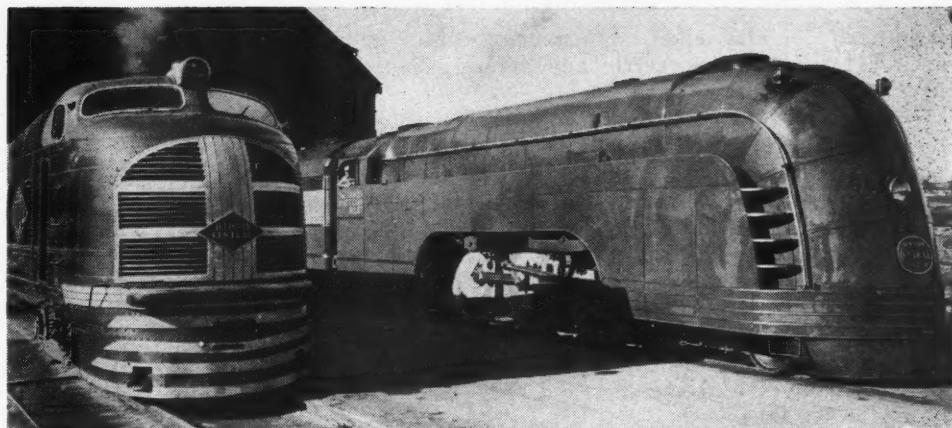
distance trains operated in connection with the U. P. and the S. P., and, second, fast day streamliners operated exclusively on the C. & N. W. The first type of trains include the following:

City of Denver (2 trains)
City of Los Angeles (2 trains)
City of San Francisco (2 trains)
City of Portland (1 train)

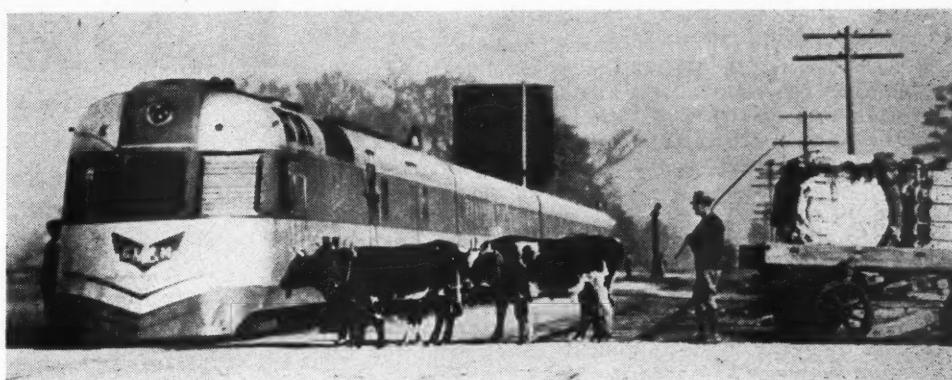
In all of these except the City of Portland, the C. & N. W. has joint ownership. The City of Denver runs daily, the others have a specified number of "sailing" dates.

On January 2, 1935, the C. & N. W. began the operation of a high-speed (7 hr.) train between Chicago and the Twin Cities. This train was christened the "400" and operated with conventional equipment until it was replaced by lightweight, streamlined Diesel-powered trains on September 24, 1939. On January 12, 1942, four more streamliners were added, the Peninsula 400, the Green Bay 400, the Capital 400 and the Minnesota 400. These were operated with exclusively streamlined equipment for several months, then, in the interests of greater wartime travel capacity, standard equipment became part of the consist of all these trains except the Peninsula 400.

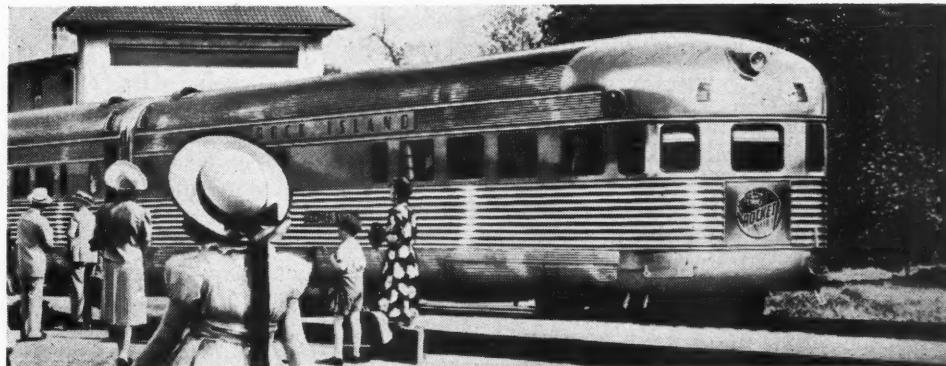
In addition to the large number of jointly-owned lightweight cars and lightweight sleepers assigned to service over the C. & N. W., this line owns 45 lightweight streamlined cars and 9 Diesel-electric and 10 steam streamlined locomotives. This lightweight equipment forms all or a part of the consist of some 25 trains daily. Based on the daily average of maximum passengers on the train at one time, the Peninsula 400 averaged 662 passengers per trip northbound and 468 southbound in 1943. This Peninsula 400 carried 674,299 passengers in less than two years. The Twin Cities 400 carried 1,368,385 passengers between September 24, 1939 and December 31, 1943;



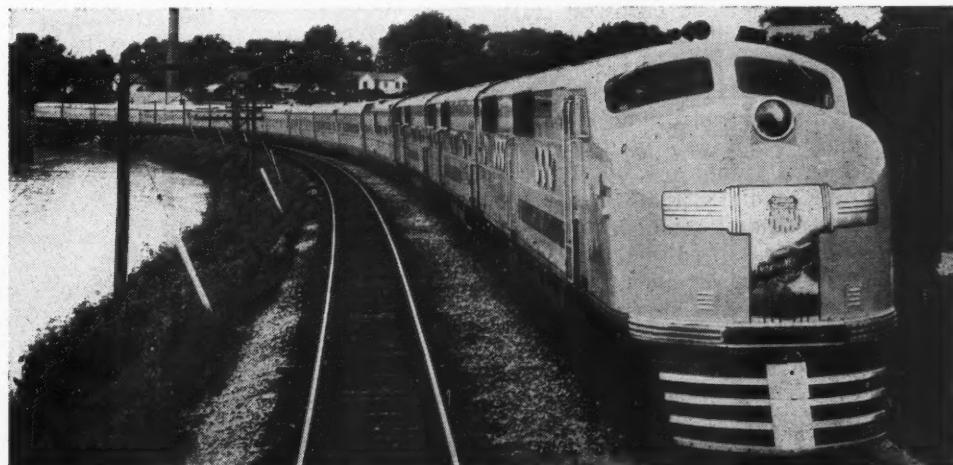
Illinois Central and New York Central Streamliners



Old and New in Transportation



Above—One of the Rock Island's "Rockets." Below—Chicago & Northwestern-Union Pacific "City of Los Angeles," Part of a Transcontinental Fleet



Train 220 (Sunday only), Menominee to Chicago, averaged 811 passengers per trip and several other trains over 300 per trip.

Chicago, Burlington & Quincy: This railway was the first to acquire a streamlined train equipped with a Diesel-electric locomotive, and the first to put a streamliner into regular revenue service, when, on November 11, 1943, the Pioneer Zephyr began running between Lincoln, Omaha and Kansas City. Since then, many changes have taken place in the runs of this and succeeding Burlington streamlined trains, which, incidentally, passed the 22,000,000 mile mark for train operation in the ten years since the first train went into service. Denver Zephyrs lead the list, and they have traveled nearly 6,000,000 miles.

The present runs of these trains have been worked out to secure the maximum utilization of the equipment and are as follows:

Denver Zephyrs (2)	Chicago and Denver
Twin Zephyrs (2)	Chicago-St. Paul-Minneapolis
Pioneer Zephyr (1)	Lincoln, Nebr., and McCook
Mark Twain Zephyr (1) . . .	St. Louis and Burlington, Iowa
Silver Streak Zephyr (2) . . .	Lincoln-Omaha-Kansas City
Zephyr-Rocket (2)	St. Louis and Minneapolis
Sam Houston Zephyr (1) . . .	Ft. Worth and Houston
Texas Rocket (1)	Ft. Worth and Houston
Ak-Sar-Ben Zephyr (1) . . .	Lincoln, Nebr., and Chicago

In addition, the major portion of the consist of the Texas Zephyrs between Denver and Dallas normally consists of lightweight equipment. Two trains in each direction between Kansas City and Omaha and one between Chicago and Lincoln, as well as the Exposition Flyer between Chicago and Oakland, normally carry a number of lightweight streamliners. On April 4, 1943, the General Pershing Zephyr was abolished as an individual train, in order that its equipment might be used to better advantage as parts of the other Burlington streamliners.

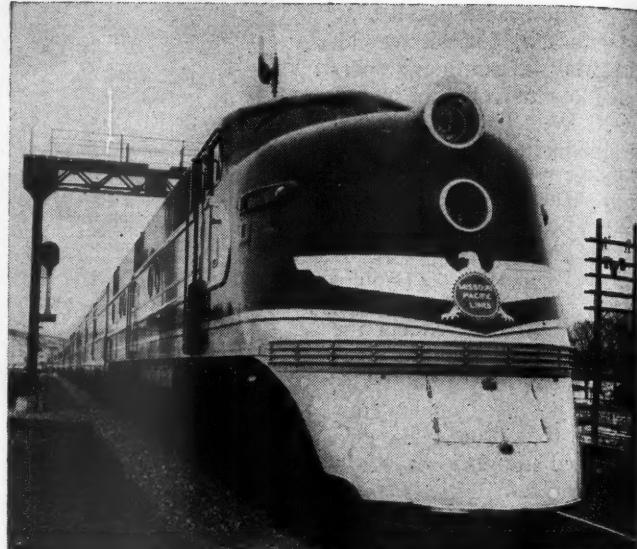
The Burlington owns 29 individual and 40 articulated or non-interchangeable lightweight streamliners, a lightweight fleet of 69 cars. Ten sleeping cars of lightweight construction originally built for this railway are now operated by the Pullman Company. The Burlington also owns 20 streamlined Diesel-electric passenger locomotives.

Chicago, Milwaukee, St. Paul & Pacific: This line began the operation of the Chicago-St. Paul-Minneapolis Hiawathas on May 29, 1935. These trains, now known as the Afternoon Hiawathas, have run 2,884,225 train miles. On January 21, 1939, the Morning Hiawathas were placed in service and they have run 1,575,716 miles. The Midwest Hiawathas, operated between Chicago and Omaha, have run 1,495,312 train miles since December 11, 1940.

The Milwaukee has continued to build the "Hiawatha" type of lightweight, streamlined cars until it now owns a total fleet of 207 cars of this type. As a result, all other principal trains are largely equipped with lightweight cars, while virtually every passenger train on the railway contains some lightweight equipment. The Milwaukee owns 4 oil-burning and 6 coal-burning streamlined steam passenger locomotives and 2 streamlined 4,000 h.p. Diesel-electric locomotives.

Chicago, North Shore & Milwaukee: This line placed two lightweight streamlined electric trains, the Electroliners, in service between Chicago and Milwaukee on February 9, 1941.

Chicago, Rock Island & Pacific: This line oper-



One of the Missouri Pacific "Eagles"

ates its Rocket lightweight streamliners between the following points:

Chicago-Kansas City and Denver-Colorado Springs (2)
Chicago and Peoria (1)
Chicago and Des Moines (1)
Kansas City and Dallas (2)
Kansas City and Minneapolis (2)
Memphis and Amarillo (2)

In addition, lightweight streamliners are operated in connection with the Burlington between Houston-Dallas-Fort Worth and between Minneapolis-St. Paul-St. Louis. Of these trains, the Chicago-Denver, Memphis-Amarillo and Minneapolis-St. Louis trains carry sleeping cars, while the remainder are day trains, with parlor car and coach service.

At the end of six years' service last fall, the 4-car Peoria Rocket had carried 1,024,043 passengers, and, as a unit, had been out of service for only 10 of its 8,816 consecutive trips. In six years, the Kansas City-Minneapolis Rocket made every one of its 4,386 scheduled trips, while the Des Moines Rocket missed only 5 of its 4,390 trips.

The Rock Island owns 19 streamlined Diesel-electric passenger locomotives.

Florida East Coast: This railway operates the daily Champion (East Coast) and, every third day, the Dixie Flagler, the City of Miami and the South Wind between Jacksonville, Fla., and Miami. For one season the streamliner Henry M. Flagler was operated only between Jacksonville and Miami, but this train was rechristened the Dixie Flagler and now operates between Chicago and Miami. During 1943 the Champion averaged more than 500 passengers per train on the F. E. C. In the first three years of operation, the Chicago-Miami streamliners operated 1,006,560 train miles over the F. E. C. and carried 669,082 passengers. The F. E. C. owns 14 lightweight streamliners and five streamlined Diesel-electric locomotives.

Gulf, Mobile & Ohio: This railway has been operating, since July 1, 1935, the overnight streamlined Rebel between New Orleans, La., and Jackson, Tenn., serving a territory now having many military training centers.

Illinois Central: This railway began streamlined operation on May 17, 1936, when the Green Diamond was placed in service between Chicago and St. Louis.

This was followed by the City of Miami (Chicago-Miami service) on December 18, 1940; and later by the Panama Limited, an all-Pullman train inaugurated on May 3, 1942. Meanwhile, a number of lightweight, streamlined rail motor cars were also placed in service. The I. C. owns 15 lightweight streamlined cars, and 20 lightweight streamlined sleeping cars are assigned to regular service on the I. C. The railway owns 6 streamlined Diesel-electric passenger locomotives.

The I. C. also handles the N. Y. C. streamliner, James Whitcomb Riley, between Chicago and Kankakee.

Kansas City Southern-Louisiana & Arkansas: This line operates the Southern Belle (3 trains) between Kansas City and New Orleans. When this service was started on September 1, 1940, all equipment except the sleeping cars was of the lightweight streamlined type. To increase the capacity of the train for wartime trans-

portation, however, conventional equipment is now a regular part of the train consist.

Louisville & Nashville: This railway serves as an intermediate line for the South Wind, between Louisville, Ky., and Montgomery, Ala., and for the Dixie Flagler, between Evansville, Ind., and Nashville, Tenn. Both of these streamliners are in the Chicago-Miami service.

Missouri Pacific: This railway owns five lightweight streamlined trains protecting three services, each of which is quite different. The Colorado Eagle, the last of the streamliners to be placed in service (June 21, 1942) operates coach and sleeping car service between St. Louis and Denver, 1,011 miles. The Missouri River Eagle is a fast day streamliner, with coach and parlor car service, which has operated between St. Louis-Kansas City-Omaha, since March 10, 1940. The third train is

one of the few streamliners in the country that is performing what amounts to local service. This is the three-car Delta Eagle, supplying coach service between Memphis, Tenn. and Tallulah, La., and serving virtually all stations en route. The Colorado Eagle has earned an average of nearly \$5.50 per train mile.

The M. P. owns 25 lightweight cars and has 10 lightweight sleeping cars regularly assigned to its lines; it owns 5 Diesel-electric streamlined passenger locomotives.

Nashville, Chattanooga & St. Louis: This railway serves as an intermediate line between Nashville and Atlanta for the Dixie Flagler, a Chicago-Miami streamliner.

New York Central: This railway now operates the following services with complete lightweight streamlined equipment:

Twentieth Century Limited (4)

New York and Chicago Empire State Express (2)

New York-Cleveland-Detroit James Whitcomb Riley (1)

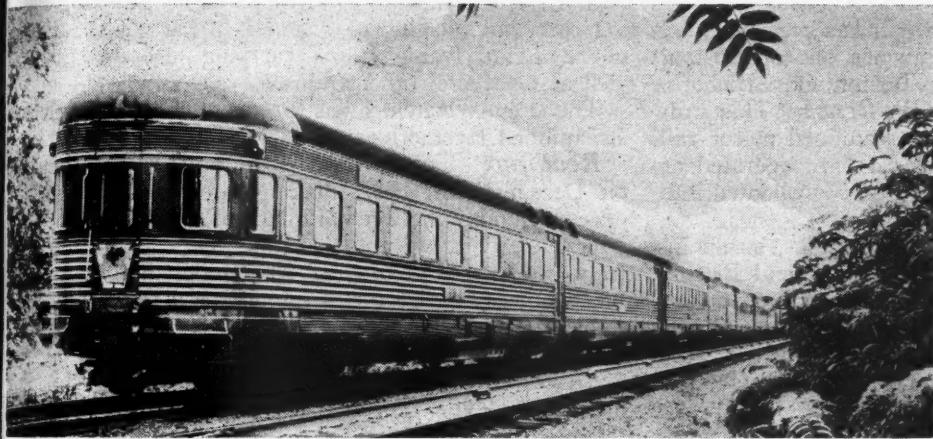
Chicago and Cincinnati Mercury (2)

Chicago-Detroit-Cleveland Pacemaker (2)

New York and Chicago

Of these, the Twentieth Century is an all-Pullman train, the Riley and Pacemaker are all-coach trains, and the Empire State and Mercury have both coach and parlor car accommodations. In 1943 the Empire State handled 768,684 passengers and the Mercury handled 613,638 passengers, the latter figure representing an increase of 56 per cent over 1942.

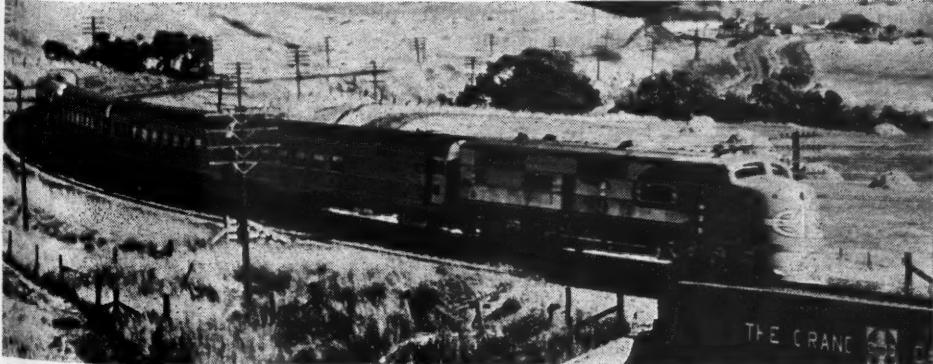
The Pennsylvania's "South Wind"



The Southern Pacific "Daylight" Is Part of a Large Fleet



One of the Santa Fe's Streamliners



Prior to the war, virtually all of the normal consist of such trains as the Commodore Vanderbilt and the Advance Commodore consisted of lightweight streamlined equipment, but wartime operation now requires the operation of many standard cars on these trains. However, the New York Central owns 157 lightweight, streamlined cars and 138 lightweight, streamlined sleeping cars are assigned in regular service on this line. As a result, some lightweight equipment is operated on practically all long-distance trains of the N. Y. C. This railway owns 15 streamlined steam locomotives.

New York, New Haven & Hartford: The New Haven owns 200 lightweight passenger cars; and 20 streamlined Diesel-electric, 10 streamlined steam and 6 streamlined electric locomotives. This equipment is operated on practically all the Boston-New York and Springfield-New York trains. However, the only completely lightweight, streamlined train regularly scheduled is the Comet. This three-car articulated train was originally placed in service on June 5, 1935, between Boston and Providence. Since the war it has been operated in commuter service on two branches out of Boston, with one round trip daily between Boston and Attleboro.

New York, Susquehanna & Western: This railway operates several lightweight streamlined motor rail cars in commuter service. These cars are operated as single units during most of the day and consolidated into trains during the rush hours.

Norfolk & Western: This line handles, as an intermediate carrier between Lynchburg, Va. and Bristol, the Tennessean streamliners of the Southern.

Pennsylvania: This railway operates two lightweight streamlined trains over its own railway, the Broadway Limited between New York and Chicago, and

the Pittsburgher between New York and Pittsburgh, both all-Pullman trains. In addition, it owns the Chicago-Florida all-coach streamliner, the South Wind, which operates over Pennsylvania rails between Chicago and Louisville. Between New York and Washington, the Pennsylvania operates the Southern's Southerners, the Atlantic Coast Line's Champion and the Seaboard's Silver Meteors and owns some of the lightweight cars operated in the Champions and Meteors.

However, all these represent only a small part of the Pennsylvania's total lightweight car operation. In peacetime, the General between New York and Chicago, the Liberty Limited between Chicago and Washington, as well as many other through trains, consisted normally of lightweight streamlined equipment, although the demands of wartime transportation have made it necessary to mix in conventional equipment on the trains last referred to. However, with a total ownership of 54 lightweight streamlined cars and a regular assignment to the Pennsylvania of 142 lightweight Pullman sleeping cars, lightweight equipment is a part of the consist of 52 Pennsylvania trains carrying sleeping cars, as well as of several other trains.

The Pennsylvania owns 9 steam and 168 electric streamlined locomotives.

Reading: This railway inaugurated the Crusader on December 13, 1937, making two round trips daily except Sunday between Philadelphia and New York (Jersey City). In the first six years' operation, this train ran a total of 679,747 train miles, and it was not taken out of service for shopping for a single day until March, 1944. The Reading owns 5 lightweight streamlined cars and two streamlined steam locomotives.

Richmond, Fredericksburg & Potomac: This line handles the New York-Miami streamliners of both the Atlantic Coast Line and the Seaboard, between Washington and Richmond, Va.

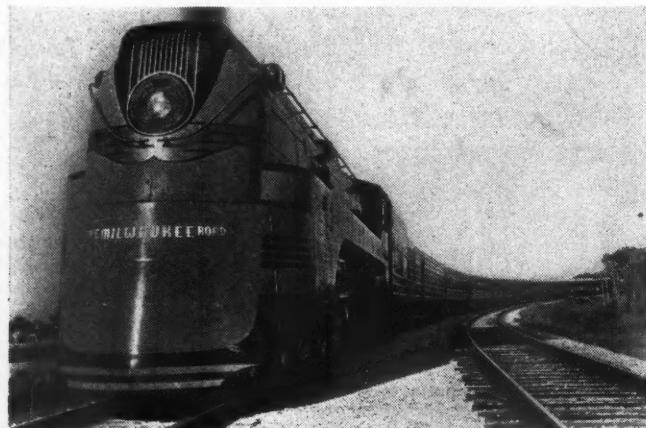
Seaboard: The Silver Meteors of this railway, inaugurated on February 2, 1939, were the first of the Florida streamliners. For summer operation, arrangements were worked out so that these trains were much used by vacationists going to the Florida seaside resorts in the summer months. These trains originally consisted of all-coach, lightweight equipment and handled largely tourist travel. Since the war, however, to obtain greater utilization, standard sleeping cars have been added to both the East and West Coast sections, and most of the tourists have been replaced as passengers by members of the armed forces en route to and from the Florida military schools, camps and airfields. As of March 31, 1944, the Silver Meteors had completed 6,193,469 train miles.

The Seaboard owns 36 lightweight streamlined passenger cars, 2 streamlined steam locomotives and 20 streamlined Diesel-electric passenger locomotive units.

Southern: This railway began streamlined service in the last half of 1939, when six two-car, Diesel-electric powered units were put in service. These are now on the following runs:

Columbus, Miss. — Mobile, Ala.
Sheffield, Ala. — Parrish, Ala.
Tuscumbia, Ala. — Chattanooga, Tenn.
Atlanta, Ga. — Brunswick, Ga.

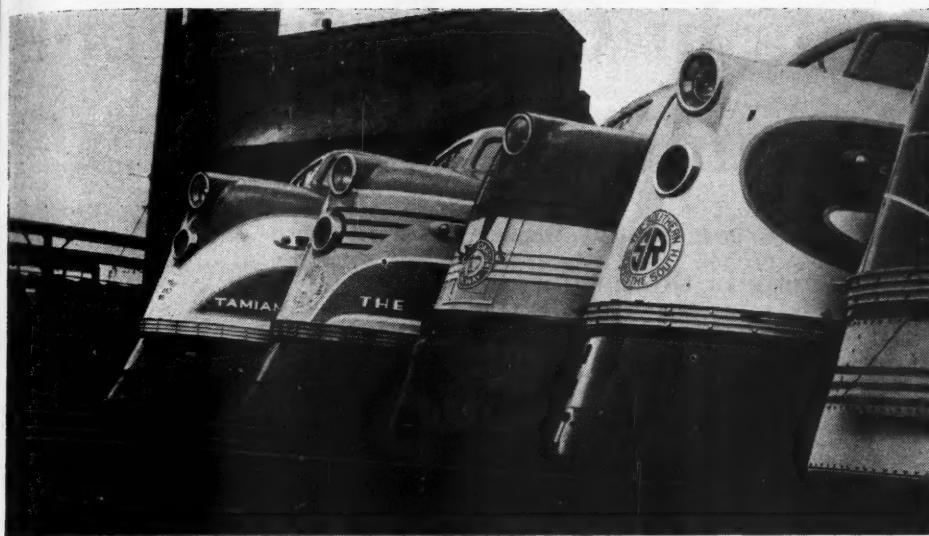
On March 31, 1941, the Southerner was placed in operation as an all-coach streamliner between New York and New Orleans, followed on May 17, 1941, by the Tennessean, operating between Washington and Memphis, which ordinarily comprises lightweight coaches and diner, but conventional sleeping cars. The South-



One of the Milwaukee's "Hiawathas"



The "Dixie Flagler" of the C. & E. I.



Atlantic Coast Line and Florida East Coast "Champions," the Seaboard's "Silver Meteor" and the Southern's "Southerner," at Washington

erner has handled as high as 209,099,936 revenue passenger miles in one year, with total passenger revenues of \$3,951,372, while the Tennessean, for the last fiscal year, handled 205,159,900 passenger miles, with revenues of \$4,849,230 and earnings per train mile of \$9.12.

The Southern owns 50 lightweight passenger cars, 1 streamlined steam locomotive, and 16 streamlined Diesel-electric passenger locomotives.

Southern Pacific: Four trains on the Pacific Lines and two on the Texas lines, consisting of two sets of equipment in each case, are still operated as entirely streamlined, lightweight trains. These are as follows:

City of San Francisco (Jointly owned with the U. P. and the C. & N. W.)	
Morning Daylight	San Joaquin Daylight
Lark	Sunbeam
Hustler	

The Noon Daylight, a highly popular streamliner, was abolished temporarily to secure greater wartime transportation efficiency and its equipment was incorporated in the San Joaquin and Morning Daylights, both of which now have a normal consist of 20 cars in each direction. From its inauguration on March 21, 1937, to the end of 1943, the Morning Daylight ran 2,542,000 train miles and handled 2,689,215 passengers. In two and one half years operation, the San Joaquin Daylight handled over one million passengers. The Lark, a 20-car all-Pullman, all-room train established the remarkable record of handling 375,452 sleeping car passengers in its first two and one half years of operation. These three trains are all operated between San Francisco-Oakland and Los Angeles.

The Hustler and the Sunbeam, operating between Houston and Dallas, have both run more than a million train miles and carried over half a million passengers each in their first five and one half and six years of operation respectively. Despite wartime handicaps, the Sunbeam still maintains a 97.14 per cent on-time record for its 6 years' operation.

In addition to these trains, the S. P. formerly operated, in connection with the Rock Island, a high-speed, extra-fare, streamlined train, the Arizona Limited, between Chicago and Phoenix, Ariz. Since this train handled virtually 100 per cent high-class tourist traffic, it was taken off as soon as war began.

The S. P. owns 148 lightweight streamlined cars and is part owner of 9 other cars of this description.

In addition, 70 lightweight streamlined Pullman cars are assigned in regular service.

The S. P. also owns 53 streamlined steam locomotives, which are used on its streamliners, regular trains and fast freight trains. It is also part owner of two streamlined Diesel-electric passenger locomotives operated on the City of San Francisco. The large fleet of lightweight cars owned by this company permits their operation as part of the consist of the Californian, the Argonaut, the Golden State Limited, the Cascade-Beaver, the Overland Limited, the Challengers and several other trains.

Union Pacific: This railway began streamlined operations with train M-10,000, later known as the City of Salina. The first streamliner delivered to any railway (in February, 1934) this train, after a long exhibition tour, was placed in revenue service on January 31, 1935. The first streamlined sleeping car train, the City of Portland, was put in service by the Union Pacific on June 6, 1935, between Chicago and Portland, in connection with the C. & N. W. The present City of Portland is owned entirely by the U. P. In addition, the U. P. operates two City of Denver and two City of Los Angeles trains, partly owned by the C. & N. W., and two City of San Francisco trains, partly owned by the C. & N. W., and the S. P. The City of Denver is a daily train, while all the others are operated on specified "sailing" dates.

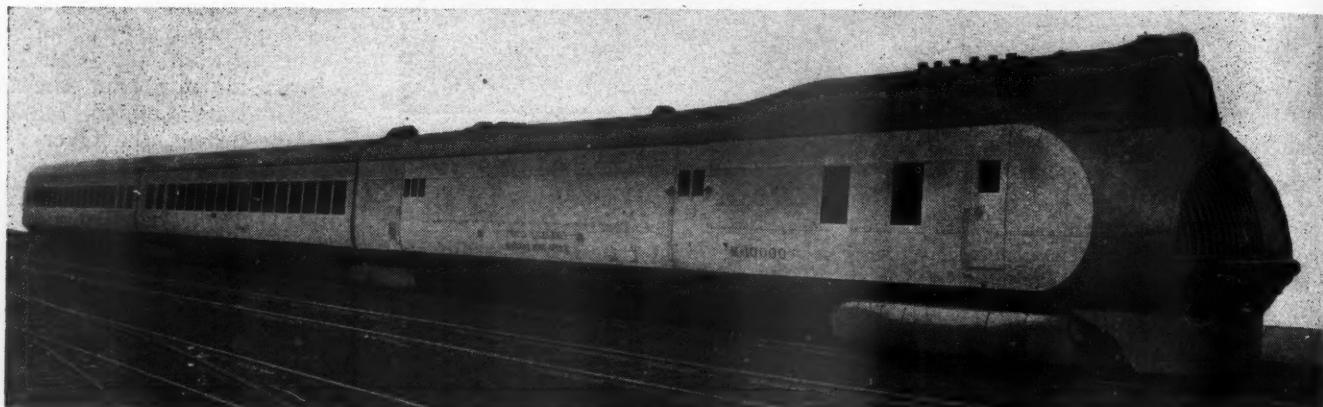
The U. P. owns a fleet of 126 lightweight cars, in addition to 37 jointly-owned cars operated regularly over its lines. In addition, 109 lightweight sleeping cars are regularly assigned in U. P. service. Thus, a large percentage of its main line passenger trains, and particularly the Challenger fleet, normally have some lightweight cars as part of their consist. The U. P. owns 12 streamlined Diesel-electric passenger locomotives.

Many other railways which did not operate streamlined trains had purchased lightweight equipment prior to the war. A number of such railways have also indicated their determination to purchase and operate streamlined trains after the war is over. As a matter of fact, no so-called "standard" heavyweight passenger equipment had been purchased by the railways for some years prior to the war, and probably none ever will be in the future. Likewise the Pullman Company has been as alert as the railways to the need of improving passenger equipment. For some years prior to the war, the trend was toward lightweight sleeping cars; and it is probable that all sleeping cars built in the future will be lightweight room cars.

The success of the streamlined trains is no longer a matter of conjecture. They have proved that they can meet competition; they halted the downward curve of railway passenger traffic after it had continued to decline through years of prosperity and depression alike. In the postwar period, every indication points to increasing purchases of lightweight, streamlined cars for which the final judge—the American passenger—has so overwhelmingly indicated a preference.

Developments in Car Equipment for Streamline Trains

Last decade shows use of new materials and spectacular innovations in the design of modern lightweight cars which have captured the public fancy



The Original Aluminum-Alloy "City of Salina" Built by Pullman-Standard for the Union Pacific

THE old canard that railroads are more or less hide-bound, non-progressive and slow to accept new ideas was never more thoroughly refuted than by the accelerated pace at which they have installed modern lightweight streamline trains since the first of these was placed in service 10 years ago. The primary objective in this development was simply to increase passenger traffic and public goodwill by installing new trains which would give fast, super-comfortable and attractive, low-cost rides, in equipment especially adapted for safe and economical operation.

The designers and builders were given almost carte blanche to produce passenger cars which would meet these objectives. New and previously untried materials and design features were built into the cars. Streamlining was adopted and the car-bodies tied together in articulated units, operating on special high-speed trucks. Striking exterior and interior decorative and color schemes were designed by experts.

Heating and air-conditioning systems included the latest developments, always with emphasis on individual requirements. Seat builders outdid themselves in supplying seats which represented the last word in comfort and attractiveness. Almost every conceivable modern convenience was installed, including radio equipment and telephone service at terminals.

The result of all this effort was an immediate favorable response on the part of the public which meant increased passenger travel and vastly improved railway prestige and public favor.

After a somewhat slow start, while the new passenger-car materials and designs were being tested in service the trend towards construction of lightweight passenger cars for both streamline and conventional trains gathered a momentum which persisted until

abruptly stopped by the war. By that time, the railroads in this country had about 120 streamline trains in service. Builders had supplied the railroads with 1,703 lightweight passenger cars which, with 616 cars of similar construction, built for the Pullman Company, made a total of 2,319 cars.

It is interesting to note, as shown in one of the tables, that most of these cars were made by three private manufacturers and one railroad car builder and are now operated on 34 railroads. Another table shows the breakdown of cars by principal structural materials and indicates that there are 484 stainless-steel cars, 209 aluminum alloy cars, 1,345 low-alloy high-tensile steel cars and 281



Seating and Lighting Facilities in a Streamline Coach

cars of the latter type with stainless-steel sheathing. The comparative lengths and weights of typical orders for these cars are given in a third table.

First Streamline Trains Delivered in 1934

As mentioned elsewhere in this issue, the first modern streamline train delivered was the three-car articulated City of Salina, built primarily of strong aluminum alloys by the Pullman Car & Manufacturing Corporation and driven by a distillate engine with electric transmission. This train was delivered to the Union Pacific on February 12, 1934, extensively exhibited throughout the country and placed in revenue service on January 1, 1935. An editorial article referring to the tenth anniversary of this train was published in the *Railway Age* of February 12.

The first Diesel-powered streamliner, built by the Edward G. Budd Manufacturing Company for the Chicago, Burlington & Quincy was the three-car stainless steel Pioneer Zephyr, delivered to the railway on April 18, 1934, and assigned to regular passenger service on November 11, 1934. The tenth anniversary of the Pioneer Zephyr's first trial run was celebrated with appropriate ceremonies on April 10, 1944, at Lincoln, Neb., as described in the *Railway Age* of April 15.

Following its trial run, the Pioneer Zephyr made an extensive tour of the country, during which it was operated over 30,000 miles, exhibited in 222 cities and inspected by more than 2,000,000 visitors. On May 26, 1934, it made a 1,015-mile non-stop run from Denver, Colo., to Chicago in 785 minutes at an average speed of 77.6 miles an hour. This record stood until October 3, 1936, when a subsequent train, one of the Burlington's Denver Zephyrs made a non-stop run in the reverse direction from Chicago to Denver in 732 minutes, or an average speed of 88.33 miles an hour. The Pioneer Zephyr has accumulated almost 1,700,000 miles since its trial run ten years ago and is reported in condition to give many more years and miles of effective service.

How the Streamliner Idea Grew

The original streamliners were intended primarily to meet highway competition on relatively short daylight runs. They were accordingly designed with coach and lounge seats, only, in three-car trains which also provided mail and baggage compartments, with power unit located in the front end of the first car.

These trains were spectacular in appearance, both in-

side and out, and almost equally spectacular in performance on the road and appeal to the public. During the years, they have grown from three, five and seven-car trains to fourteen-car trains, with one-, two- and three-unit Diesels, or streamline steam locomotives, on the head end. They have expanded in service from small short-run coach trains to luxuriously-appointed transcontinental sleeping trains with full accommodations for both coach and first-class passengers.

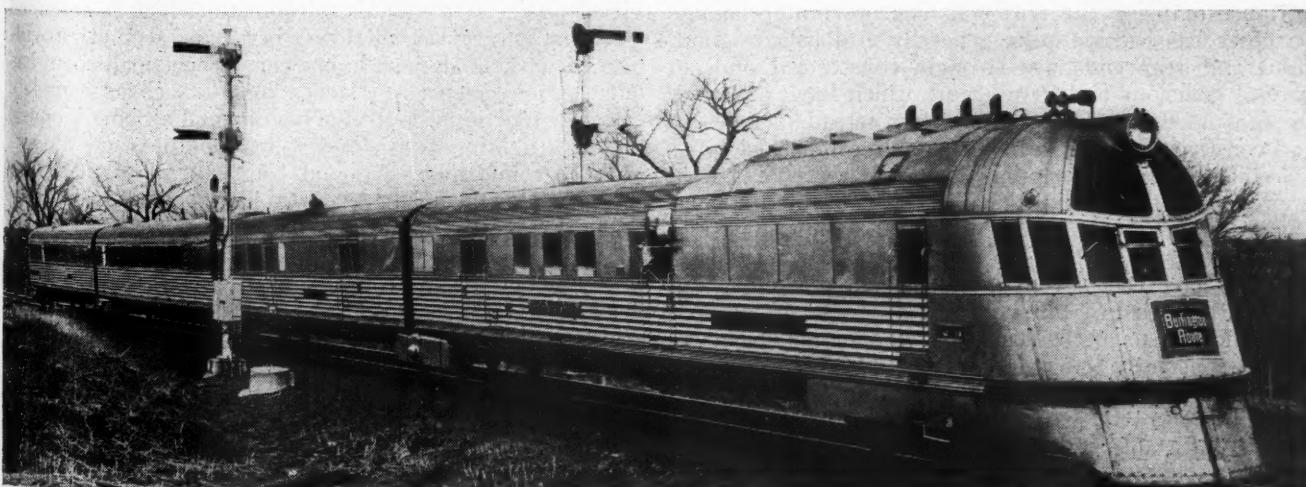
The first trains were fully articulated, with three car-body units operating on four four-wheel trucks. In construction the cars looked like one long, continuous tube with flush windows and doors, flexible closures between cars, deep-skirted sides and shrouded trucks, and streamline front and rear ends. One of the original trains was designed with the cars 8 in. narrower and car roofs 3 ft. lower than usual railroad standards, the objectives being to reduce head-end air resistance and power requirements, also to give a lower center of gravity and hence greater ease in negotiating curves at high speeds.

Experience showed that the importance of both of these objectives was somewhat overshadowed by the need of capitalizing on large railway clearances, as compared with those of most highways, and constructing cars of large cross section with maximum passenger appeal. The early development of larger Diesel engines decreased the urgency of conserving power and, as a result, later streamline trains largely reverted to standard outside dimensions, the inside widths being actually increased from 6 to 9 in. by more-efficiently designed, thin, but well-insulated, wall sections.

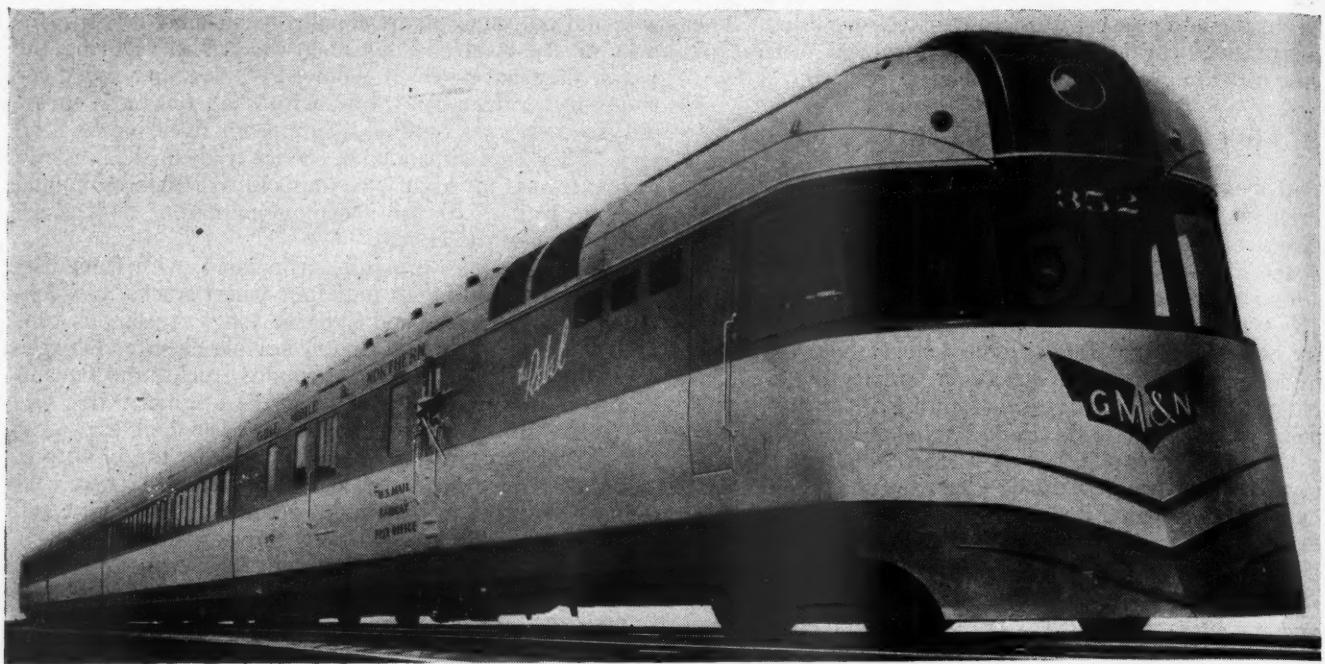
Limited Benefits of Articulation

Advantages sought by the articulated construction of early streamliners included reduced weight and cost, smoother riding at high speeds, elimination of overhang at car ends and simplified end and vestibule construction. The number of car-body units articulated to form single trains gradually increased and reached as many as nine, but, here again, practical considerations overruled advantages which were to a certain extent theoretical and, in any event, of less pressing importance.

The need for flexibility in train make-up to meet varying traffic demands and also the impracticability of tying up an entire train for some mechanical difficulty with one car-body unit, soon demonstrated the limitations of articulated construction. In recent streamliners, articulation has been largely limited to two-car units such as a kitchen



Stainless-Steel "Pioneer Zephyr" Built by Budd Ten Years Ago



The "Rebel" Trains Built by the American Car and Foundry Company—First of the Streamliners of High-Tensile Low-Alloy-Steel Construction

car and a diner or a men's coach and a women's coach which always run together and consequently can be operated as articulated units to advantage.

The idea of flush windows and doors on early streamliners has persisted, also end closures between cars and skirted sides, although neither of the latter features has been invariably followed. They are desirable from an appearance standpoint and for streamlining, but the closures are difficult to maintain and the lower car sides hide underneath equipment and help retain large volumes of snow and ice which collect under the cars when operating in cold climates. Truck shrouding, the pet idea of early streamline experts, proved to be an abomination to maintainers and has either been eliminated on recent streamline trains or designed so that the truck wheels, journals and parts can be more easily inspected and serviced.

Pullman Accommodations Greatly Improved

In general, the front ends of the original streamliners have been changed by relocating the air intakes elsewhere and smoothing the lines of the front ends. The importance of using the rear ends for observation-lounge purposes has become quite generally established. Both front and rear ends are strongly constructed and, in several collisions and derailments which have occurred, the fundamental soundness of modern streamliner design and construction have been thoroughly established.

While the first streamline trains represented a vast improvement over conventional equipment from the point of view of comfort, convenience and aesthetic appeal to passengers, still further notable accomplishments along this line have been effected, and no better example can be cited than that of Pullman cars.

In addition to mechanical changes and refinements in design, constantly being studied by the Pullman research organization, Pullman sections in the later cars have been radically improved, seats and backs made adjustable and more comfortable with sponge rubber cushions. Rubber mattresses of more comfortable design have been perfected and were generally installed until war demands temporarily halted the use of rubber for this purpose. An

arrangement has been developed by which the section, when occupied by a single passenger, can have the bed raised after it is made to provide sitting and standing space within the section for dressing and undressing.

An entirely new roomette, with folding bed and all the conveniences and privacy of larger rooms, gives small-room accommodations for occupancy by one person. A duplex room with upper and lower interlocking rooms enables 12 such rooms and five double bedrooms to be provided in a single car with attendant economies. Radically improved compartments, drawing rooms and master bedrooms have to be seen to be appreciated.

A low-cost coach sleeper has three tiers of berths vertically arranged in groups of three and six, providing dressing space and wash facilities for each group. The facilities are so designed that the car can be quickly converted from an open coach, seating from 42 to 48 people, to night accommodations furnishing a comfortable bed for each passenger and complete privacy. The purpose of this car is to furnish a car of large capacity at an exceptionally low rate.

Still one further radically new and important Pullman development is the Duplex-Roomette which is intended eventually to replace the lower berth and section, providing 24 accommodations in one car. Each small room has all the conveniences of larger rooms, such as complete privacy, individual control of heating and air conditioning, modern lighting, wash and toilet facilities and an unusually comfortable seat and bed. In all of these improvements, the primary effort has been to meet individual requirements of the average passenger.

Three Basic Car Structural Materials

Reviewing briefly, experience with the first two streamline trains, and subsequent trains as well as individual cars, demonstrated the practicability of using three entirely different types of structural material and three different manufacturing processes in building lightweight passenger cars.

One of these, exemplified by the Burlington's Pioneer Zephyr, utilizes thin-gage sheets and built-up sections of

Lightweight Passenger Train Cars Supplied to Individual U. S. Railroads, as Reported by the Builders

Railroad	A. C. F.	Budd	Pull.-Std	Other builders	Total
Alton	16	162	7	1 (f)	16
A. T. & S. F.	..	31	..	1 (c)	31
A. C. L.	..	..	9	..	9
Ban. & A.	..	3	51	..	54
B. & M.	..	..	..	8 (a)	8
C. of G.	..	..	..	3 (a)	3
C. & N. W.	..	..	68	..	68
C. & S.	..	5	..	..	5
C. B. & Q.	..	83	..	1 (c)	84
C. M. St. P. & P.	..	..	..	207 (e)	207
C. N. S. & M.	..	..	42	20 (f)	3
C. R. I. & P.	..	..	..	..	62
D. & H.	6	..	..	..	6
D. & R. G. W.	..	4	..	..	4
F. E. C.	..	14	..	..	14
F. W. & D. C.	..	7	..	..	7
G. M. & O.	10	..	..	..	10
G. N.	..	..	12	1 (c)	13
I. C.	..	..	14	..	14
K. C. S.	..	..	15	..	15
L. V.	..	..	10	..	10
M. P.	12	11	..	2 (f)	25
N. & W.	..	..	15	..	15
N. Y. C.	25	26	55	25 (d)	141
N. Y. N. H. & H.	..	..	205	3 (b)	208
N. Y. R. T.	..	5	..	..	5
Penna.	5	40	5	1 (d)	51
Reading	..	5	..	..	5
St. L. S. W.	..	..	10	..	10
S. A. L.	36	..	10	..	46
Southern	..	..	47	..	47
S. P.	..	..	148	..	148
U. P.	..	..	188 (g)	..	188
Total railroad	74	484	889	256	1,703
Pullman owned	..	..	616	..	616
Grand Total	..	..	..	..	2,319

a—Bethlehem Steel Company

b—Goodyear-Zeppelin Corporation

c—Pacific Railway Equipment Company (Pendulum-type car)

d—Pressed Steel Car Company

e—Railroad Company Shops

f—St. Louis Car Company

g—Includes cars jointly owned with S. P. and C. & N. W.

stainless steel, joined by the Budd Shotweld process. This steel has an exceptionally high tensile strength, on the order of 150,000 lb. per sq. in., satisfactory ductility, high resistance to corrosion and a smooth bright finish for use on outside sheathing. The car parts are assembled in a body structure all parts of which, from floor to roof, are

utilized for load-carrying functions, with attendant important savings in weight.

The original three-car Zephyr, weighed only 218,800 lb., including the power plant, which may be compared with 160,000 lb. for a single coach, or about 190,000 lb. for a sleeper or a lounge car, utilizing former riveted carbon-steel construction. The original Zephyr is still in service and this type of Budd stainless steel construction, with some modifications and refinements in design, has been used in 484 cars built subsequently for use on railways in this country. Twenty-eight stainless steel cars in addition, have been constructed for the Portuguese National Railway, making a total of 512 cars of this construction.

Another type of material, used in the Union Pacific's first streamliner, City of Salina, comprises strong aluminum alloys, heat treated to give tensile strengths of 60,000 to 80,000 lb. per sq. in. and having the added advantages of easy workability, corrosion resistance and exceptionally low weight per unit of volume. Riveting is employed for the most part in cars constructed of this material which is used for all structural parts except bolsters, truck frames and other special castings. Tubular car-body construction and accurate extruded aluminum shapes, strongly interlocked, functioned to give the greatest strength with the least amount of metal in the first three-car aluminum streamliner which was 204 ft. 5 in. long and weighed only 204,600 lb.

Not long after Pearl Harbor, the City of Salina was scrapped, partly to meet the government's need for aluminum scrap, but primarily because the distillate power plant was obsolete and the train not adapted to modern service requirements.

However, no criticism of either the structural material or the train design from a strength standpoint was implied. In fact, cars constructed of strong aluminum alloys by the same builder have been giving satisfactory service for years in seven "City" trains operated jointly by the U. P., S. P. and C. & N. W. Reference to the first table shows that three different car builders have supplied 149 lightweight aluminum-alloy passenger cars to the railroads and 60 cars to the Pullman Company, or a total of 209 cars.

With the development of low-alloy high-tensile steels, having tensile strengths of 60,000 to 70,000 lb. per sq. in., and also featured by corrosion resistance, easy welding and shop working, a third material became available which had the important economic advantage of relatively low cost.

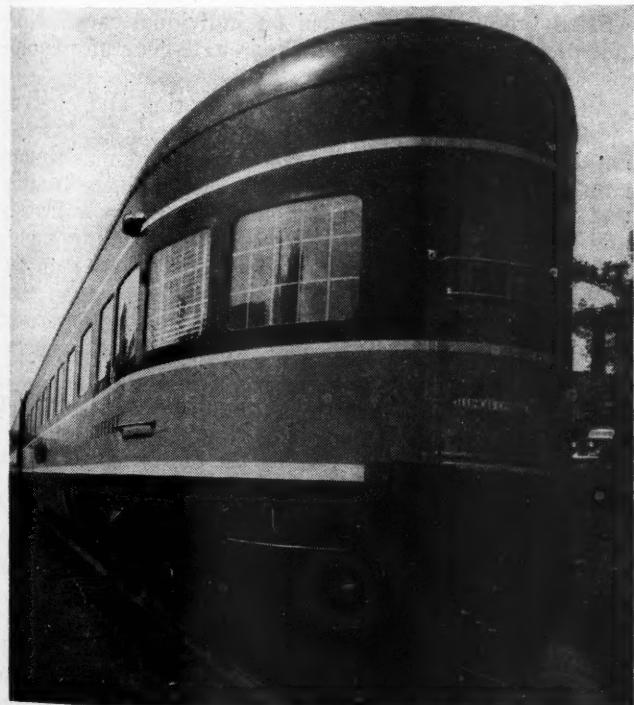
Streamline cars and trains, involving either welded girder or truss-type frame construction, and using low-alloy high-tensile steels as the principal structural material, have been built with probably less overall weight reduction than possible with either aluminum or stainless steel, but with appreciable savings, nevertheless, in both weight and cost.

A total of 1,345 railroad and Pullman cars of this type have been constructed, and 281 additional low-alloy-high-tensile steel cars have stainless steel sheathing applied as exterior finish.

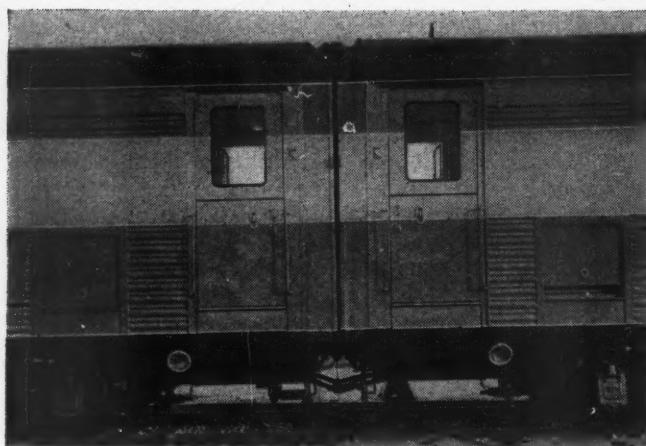
Summarizing Mechanical Improvements

Little more than a brief partial summary of mechanical improvements stimulated by the introduction of modern lightweight streamline trains in this country can be given here.

As a result of intensive research and development in new structural materials for passenger cars and improved methods of fabrications, car weights have been reduced



Rear of the "Panama Limited" of the Illinois Central



Closure Diaphragms Between Modern Streamline Cars

about one-third over conventional cars built 10 years ago which means that 50 per cent more cars can be hauled by the same locomotive or the same number of cars hauled at higher speeds.

Early streamlining in many instances followed too closely theoretical designs, based on wind-tunnel tests, and did not give enough weight to practical considerations. Modified streamlining, with ample provision for easy inspection and servicing of equipment, is a development over the years which saves a certain amount of power and undoubtedly gives attractive lines to please the public.

Continuous research, both before and since the advent of streamline trains, has been conducted with the object of improving the riding qualities of passenger cars at high speeds. Many different types of trucks have been designed, and placed in service, with results observed both by personal reaction and shock-recording instruments.

For lightweight cars, the trend has been definitely towards the four-wheel truck which seems to meet all requirements for safe, easy riding with considerable savings in weight.

With wheel conditions maintained to rigid standards and flexible spring suspensions suitably damped, smooth-riding cars are in general assured. Recently developed heat-treated hollow steel axles promise to give increased strength and service life and, at the same time, effect some savings in weight.

Truck shocks and noise are minimized by the quite extensive use of rubber or will be when this material is again made available. Roller bearings are widely, but not exclusively used, on the trucks of streamline trains and contribute many advantages in operation, as shown by service experience with these trains. Considerable importance attaches to the various types of protective de-

vices, developed to give warning of excessive journal heating.

The Pullman Company, in conjunction with the Chrysler Corporation, the Pennsylvania and the New York Central is conducting a research in the matter of securing increased riding comfort by improvement in the design of trucks, couplings, car body suspension, etc. The Chrysler laboratory has been especially equipped for this purpose and the laboratory work is being supplemented by service tests on the new designs developed.

The higher speeds of streamline trains showed the need for better brakes and, as a result of combined research between the air-brake manufacturers and the railroads, brakes have been developed which will stop trains from high speeds in shorter distances than were formerly possible from much lower speeds. In response to the need, shown by experience with streamline trains, generally effective devices have been developed to prevent wheel sliding.

To decrease the punishment given to steel wheels by severe braking, disc-type truck brakes have been suggested by which brake shoes are removed from the wheels and the braking effort transferred to drums, keyed to car axles between the wheels. Budd disc-type brakes were first placed in operation on the Burlington's Zephyr train "General Pershing" and have since given successful service on equipment for a number of other roads. Another disc brake is now under development by the Pullman Company.

Heating and Air-Conditioning Progress

The inauguration of lightweight high-speed trains opened an era of refinement in all features affecting comfort and attractiveness. Air-conditioning, while already well established, has been improved, particularly during the last 10 years, in those features affecting air distribution and temperature control. The unit train was well adapted to use of the head-end system of power generation for both air-conditioning and lighting. As emphasis changed more or less from unit trains to interchangeable equipment, however, small self-contained Diesel-engine and propane-engine-driven electric-generating plants were developed and installed on individual cars. Notable progress has also been made in axle-generator equipment and driving mechanism.

In general, the various types of heating and air-conditioning equipment have been improved on the basis of experience with early streamline trains and much more effective zone control made available for both the heating and cooling cycles. The standards set up by railroads and the manufacturers of heating and air-cooling equipment are very high. They call for nothing less than the provision of equipment and controls designed so that every available space for passenger occupancy, wherever located in the car, shall be comfortable from a temperature standpoint.

The use of air-conditioning eliminates the need for windows which can be opened in summer and several types of fixed sash are replacing the old removable type, plate glass of greatly improved quality being used to facilitate clear vision. Double glazed sash units, equipped with suitable dehydrating material between sealed panes, have been designed so that they are easily removable when desired by coach-yard or shop forces.

One of the fields of passenger-car design in which the greatest improvement has been effected is that of lighting. Light intensity, generally unsatisfactory in most railway cars prior to the advent of streamline trains, has now been increased and new methods of distribution effected.

General Types of Construction Used in Lightweight Passenger Cars

Car builder	Stainless steel	Aluminum alloy	Low-alloy H.T. steel	H.T. steel with stain-steel sheathing		Totals
				74	11	
American Car & F'dry.	...	20	54	...	...	74
Bethlehem Steel	11	...	...	11
Budd Manufacturing	484	...	...	...	...	484
Goodyear-Zeppelin	...	3	...	...	...	3
Pacific Ry. Equip.	3	...	...	3
Pressed Steel	26	...	...	26
Pull.-Std. (Rr. cars)	...	126	551	212	...	889
Pull.-Std. (Pull. cars)	...	60	487	69	...	616
Railroad shops	207	...	...	207
St. Louis Car Co.	6	...	...	6
Totals	484	209	1,345	281	...	2,319

Comparative Weights and Construction of Representative Lightweight Passenger Train Cars

Road	Number of Cars	Class	Length ft.-in.	Weight lb.	Structural material	Year built	Car builder
Atchison, Topeka & Santa Fe.....	47	Coach	79-10	104,000	Stain. steel	1937	E. G. Budd Mfg. Co.
	18	Diner	83- 2	115,500	Stain. steel	1938	E. G. Budd Mfg. Co.
	16	Chair	83-10	111,790	Stain. steel	1941	E. G. Budd Mfg. Co.
	5	Bag-mail	73- 8	92,950	Stain. steel	1941	E. G. Budd Mfg. Co.
	2	Bag-chair	73- 6	102,455	H. T. steel	1939	Pullman-Standard
	1	Chair-obs.	73-11	102,967	H. T. steel	1939	Pullman-Standard
	1	Club-lounge	73- 6	105,390	H. T. steel	1939	Pullman-Standard
A. T. & S. F., C. B. & Q., G. N.	3	Coach	85	109,000	H. T. steel*	1941	Pacific Ry. Equipment Co.
Atlantic Coast Line.....	6	Coach	85	105,750	Stain. steel	1939	E. G. Budd Mfg. Co.
Baltimore & Ohio.....	2	Coach	70- 0	88,600	Alum. alloy	1935	American Car & Foundry Co.
	2	Chair	70- 0	88,200	Alum. alloy	1935	American Car & Foundry Co.
	2	Chair	70-10	98,400	H. T. steel	1935	American Car & Foundry Co.
Bangor & Aroostook.....	3	Buf-coach	84- 9	117,600	H. T. steel	1937	Pullman-Standard
Boston & Maine.....	3†	.....	199- 3	213,600‡	Stain. steel	1935	E. G. Budd Mfg. Co.
	20	Coach	84	108,700	H. T. steel	1937	Pullman-Standard
Central of Georgia.....	5	Coach	84- 3	120,000	H. T. steel	1937	Bethlehem Steel
Chicago & North Western.....	16	Chair	81- 0	113,900	H. T. steel	1937	Pullman-Standard
	15	Coach	82- 3	113,487	H. T. steel	1941	Pullman-Standard
	6	Parlor	82	112,900	H. T. steel	1939	Pullman-Standard
	3	Diner	82- 8	122,386	H. T. steel	1941	Pullman-Standard
Chicago, Burlington & Quincy.....	3†	.....	197- 1	218,800‡	Stain. steel	1934	E. G. Budd Mfg. Co.
	6	Sleeper	76- 3	81,600	Stain. steel	1936	E. G. Budd Mfg. Co.
	3	Diners	83- 2	115,000	Stain. steel	1938	E. G. Budd Mfg. Co.
	9	Coach	79- 8	103,480	Stain. steel	1940	E. G. Budd Mfg. Co.
Chicago, Mil., St. Paul & Pacific.....	19	Coach	80- 9	100,000	H. T. steel	1937	Company shops
	7	Diners	80-11	109,600	H. T. steel	1937	Company shops
	5	Pass.-bagg.	80- 9	98,500	H. T. steel	1937	Company shops
	4	Rear parlor	80- 8	91,700	H. T. steel	1938	Company shops
	19	Coach	82- 3	113,000	H. T. steel	1942	Company shops
Chicago, Rock Island & Pacific.....	10	Coach	78- 6½	113,300	H. T. steel	1938	Pullman-Standard
	6	Coach	76- 5	85,650	Stain. steel	1937	E. G. Budd Mfg. Co.
	4	Coach	79- 8	104,700	Stain. steel	1940	E. G. Budd Mfg. Co.
	2	Diner	83-	114,000	Stain. steel	1940	E. G. Budd Mfg. Co.
	4	Diner-obs.	79- 8	113,438	H. T. steel	1940	Pullman-Standard
Delaware & Hudson.....	6	Coach	84- 9	115,000	H. T. steel	1939	American Car & Foundry Co.
Gulf, Mobile & Ohio.....	3	Coach	75-10	94,000	H. T. steel	1935	American Car & Foundry Co.
	2	Obs.-sleeper	77- 0	93,200	H. T. steel	1935	American Car & Foundry Co.
Illinois Central.....	4†	.....	.....	311,800‡	H. T. steel	1936	Pullman-Standard
	20	Bag-exp.	52- 6	72,200	H. T. steel	1937	American Car & Foundry Co.
	3	Coach	84- 6	107,728	H. T. steel	1940	Pullman-Standard
	2	Diner	84- 6	128,667	H. T. steel	1941	Pullman-Standard
Lehigh Valley.....	10	Coach	74- 9	113,200	H. T. steel	1939	Pullman-Standard
Missouri Pacific.....	6#	.....	.....	596,980	Alum. alloy	1940	American Car and Foundry Co.
New York Central.....	6	Diner	84- 6	135,300	H. T. steel	1938	Pullman-Standard
	2	Coach	79-10	96,500	Stain. steel	1938	E. G. Budd Mfg. Co.
	25	Coach	82- 2½	125,000	H. T. steel	1941	Pressed Steel
	25	Coach	82- 2½	126,400	H. T. steel	1941	American Car & Foundry Co.
	45	Coach	82	121,200	H. T. steel	1941	Pullman-Standard
	16	Coach	85	114,140	H. T. steel	1941	E. G. Budd Mfg. Co.
New York, New Haven & Hartford.....	3†	.....	207	260,600‡	Alum. alloy	1935	Goodyear-Zeppelin
	50	Coach	82- 4½	107,000	H. T. steel	1936	Pullman-Standard
Pennsylvania.....	2	Diner	84- 8	105,600	Stain. steel	1937	E. G. Budd Mfg. Co.
	15	Coach	84- 8	107,400	Stain. steel	1939	E. G. Budd Mfg. Co.
	5	Diner	84- 6	113,400	H. T. steel	1939	American Car & Foundry Co.
	12	Coach	85	113,660	Alum. alloy	1941	Pullman-Standard
Reading.....	5	Cars	327	112,835	Stain. steel	1941	E. G. Budd Mfg. Co.
St. Louis-Southwestern.....	10	Coach	82- 4	117,700	H. T. steel	1937	Pullman-Standard
Seaboard Air Line.....	6	Coach	82- 4½	112,400	H. T. steel	1936	Pullman-Standard
	4	Pass.-bagg.	82- 4½	109,700	H. T. steel	1936	Pullman-Standard
	1	Diner	84- 8	123,900	Stain. steel	1939	E. G. Budd Mfg. Co.
	7	Coach	84- 8	105,915	Stain. steel	1940	E. G. Budd Mfg. Co.
Southern.....	4	Coach	72- 9	114,700	H. T. steel	1939	St. Louis Car Co.
	18	Coach	84- 6	105,500	H. T. steel	1940	Pullman-Standard
	6	Pass.-bagg.	84- 6	103,000	H. T. steel	1940	Pullman-Standard
Southern Pacific.....	12	Coach	66- 1	85,200	H. T. steel	1937	Pullman-Standard
	4	Diner	79- 2	115,700	H. T. steel	1937	Pullman-Standard
	7	Chair	68	92,041	H. T. steel	1940	Pullman-Standard
Union Pacific.....	40	Coach	81- 0	110,500	Alum. alloy	1937	Pullman-Standard
	5	Diner	70- 0	207,700	Alum. alloy	1938	Pullman-Standard
	30	Chair	84- 9	135,388	Alum. alloy	1941	Pullman-Standard
	30	Bagg.	84- 6	135,902	Alum. alloy	1941	Pullman-Standard
	3†	.....	.....	204,660‡	Alum. alloy	1934	Pullman-Standard
U. P. C. & N. W.....	14†	.....	.....	1,622,700‡	Alum. alloy	1937	Pullman-Standard
U. P. S. P. C. & N. W.....	14†	.....	.....	1,581,200‡	Alum. alloy	1937	Pullman-Standard

* Stressed skin, pendulum type cars

† Articulated units.

‡ Length and weight of train as a whole

One of two 6-car trains, non-articulated

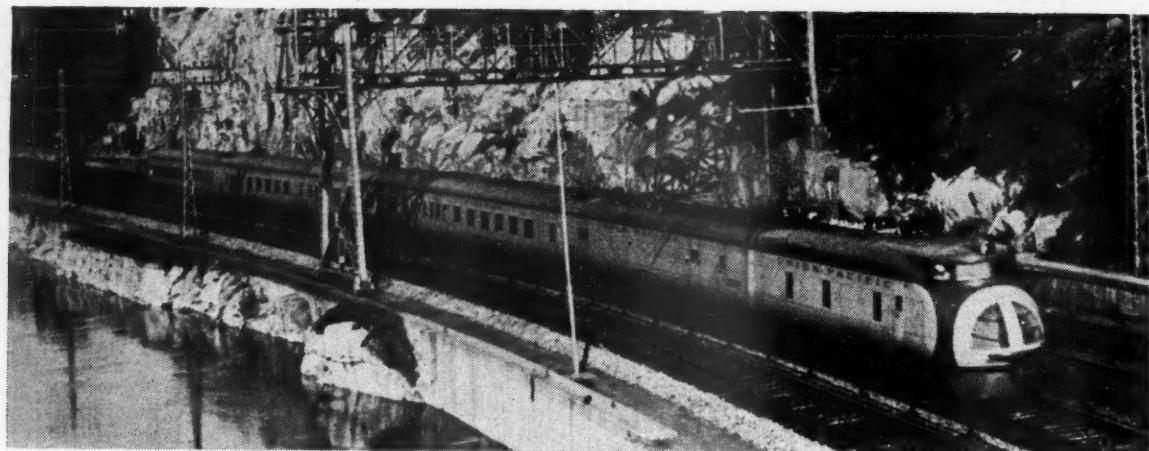
These frequently involve fluorescent lighting and the use of modern plastics as diffusing and light-decorative media, in numerous combinations of direct and indirect light.

In the field of decorative treatment, the entire atmosphere in modern passenger cars has been changed, and for the better. Careful interior design and ornamentation, and the effective use of color, under the direction of experts, have been largely responsible for this. Probably the pendulum may have swung too far in the way of bright colors and fabrics which are difficult to maintain and keep clean, but experience during the last few years indicates that eye appeal must be maintained in cars of the future in order to attract and satisfy passengers.

One humble detail, which has probably been improved the most and contributed greatly to passenger comfort in

modern streamliners, is the coach seat. This improvement began shortly prior to the advent of streamline trains with the introduction of individual seats patterned after those then in use on de luxe buses. This departure from the venerable walkover type of coach seat, in which passenger comfort was compromised in the interest of reversibility, was as revolutionary as it was badly needed. It introduced a period of development in seats of the rotating, reclining-back type properly proportioned and having exceptionally comfortable rubber cushions.

As with almost every other detail of streamline train equipment, improvement in coach seats has not stopped and an organized study is even now being made to determine the seat dimensions which will prove most comfortable to the largest number of passengers.



The Second Union Pacific Streamliner with a 900-Hp. Locomotive Unit

What the Streamliners Have Done for Passenger Motive Power

Importance of high horsepower-weight ratio demonstrated — Unit capacity of Diesels rapidly increased — Utilization of steam power accelerated

IN February, 1934, the first lightweight streamline articulated motor train was delivered to the Union Pacific by the Pullman Car & Manufacturing Corporation. About two months later the second streamliner was delivered to the Chicago, Burlington & Quincy by the Edward G. Budd Manufacturing Company. Unlike the gas-electric rail-motor cars which, with or without trailers, were put in service during the 1920's as a means of reducing losses on a declining passenger traffic, these trains were designed to set new standards of travel comfort, convenience and attractiveness and to revolutionize the prevailing situation with respect to passenger-train schedule speeds and train-mile operating costs. These two trains were the prototype of many others. The changes in passenger-car construction and standards of passenger-train service which they introduced have been widespread and have, in turn, exerted a marked influence on the trend of development of passenger-train motive power.

In terms of motive power the objectives of the designers of the first two streamliners required the attainment of high speed with a minimum of horsepower capacity. Three main factors are combined to accomplish this—the use of new materials and special features of design to save weight, streamlining to reduce air resistance at high speeds, and the lightweight oil-burning engine.

Since these new trains were to be operated where traffic was relatively light with the hope that attractive trains and faster schedules might restore travel to the rails, the size of the train would not permit the use of even a small locomotive without completely unbalancing the ratio of the weight of the motive power to the

weight of the passenger-train cars. The fullest advantage was taken of the lighter and stronger materials of construction and the car bodies were articulated so that weight might be kept low enough to permit the use of a built-in power plant. To reduce further the demands on power-plant capacity the cross-sections of the cars were reduced below those of standard passenger-train cars, thus saving more weight as well as reducing air resistance at high speeds.

In designing both of these trains the form of the streamlining was developed on the basis of wind-tunnel tests with scale models.

The Union Pacific train comprised three body units carried on four trucks. The body structure was tubular in form and utilized the strong alloys of aluminum as the principal material of construction. The bodies were only 9 ft. in width at the widest point. The power plant consisted of a 600-hp., 12-cylinder V-type distillate-burning Winton engine and direct-connected generator. It utilized the Duff system of distillate burning which was then in use in rail motor cars of the Union Pacific.

Power vs. Weight

The first Burlington Zephyr was a three-unit train of Shotweld stainless-steel construction carried on four trucks. This train was powered by the newly developed 600-hp. two-cycle Winton Diesel engine with eight inline 8-in. by 10-in. cylinders operating at 750 r.p.m. This engine weighed about 22 lb. per rated horsepower bringing it within limits feasible for use in mobile power plants. It had been exhibited at the Century of Progress Exposition at Chicago during 1933.

When these trains went into service conventional passenger coaches for use in main-line trains weighed from 60 to 80 tons. Sleeping cars weighed well up toward 90 tons. Trains of 1,000 to 1,200 tons were being handled regularly and some of the faster schedules in the country were being maintained with such trains hauled by locomotives developing from 3,000 to 4,000 indicated horsepower—an indicated horsepower of 2.5 to 2.75 per ton of gross train weight. From 20 to 25 per cent of this weight was accounted for by the locomotive. Few steam locomotives had been designed for service in which they would furnish more than 3 to 4.5 hp. per ton of the trains they were built to handle. The designers of the streamliners approached the problem of more horsepower per ton from the standpoint of weight reduction rather than from that of more horsepower. The Union Pacific train weighed slightly less than 100 tons and the Burlington train slightly more than 100 tons. They thus approximated a ratio of 6 hp. per ton of total weight. The weight of the power plant, power truck, and that portion of the structure required to house the power plant was approximately one half of the total weight.

During the years immediately following a number of other small articulated motor trains similar to these first streamliners were built for other railroads. It is a significant fact, however, that almost immediately the need for increased carrying capacity led to the expansion of the built-in power plant into a full-fledged Diesel-electric locomotive unit. The third motor train, which later became the City of Portland on the Union Pacific, was

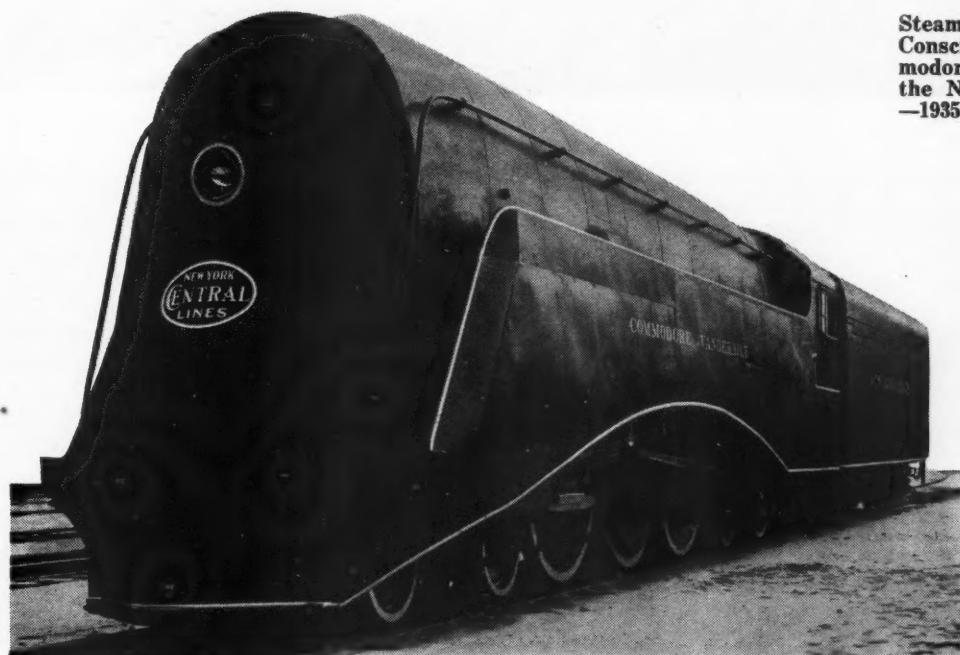
train. From that point on the Diesel locomotive expanded in capacity fairly steadily. The first City of Los Angeles, which entered service in May, 1936, was powered with a two-unit locomotive with a 1,200-hp. Diesel electric power plant in the first cab and a 900-hp. Diesel-electric power plant in the second cab. In the case of the City of San Francisco, which went into service about a month later, both locomotive cabs carried 1,200-hp. Diesel-electric power plants. Each of these trains consisted of nine revenue body units, all of which were articulated. In each case the locomotive provided more than 4 hp. of prime-mover capacity per ton of gross train weight, and the motive-power units accounted for approximately one-third of the train weight.

Diesel Locomotive Sizes Multiply

Another streamline train which went into service in May, 1936, was the first Super Chief of the Atchison, Topeka & Santa Fe. This train, which consisted of nine separate revenue cars, was hauled by a 3,600-hp. Diesel-electric locomotive in two cab units, each housing two 900-hp. Diesel-electric power plants.

With the normal consist of this train, the locomotive provided about 5 hp. of prime-mover capacity per ton and accounted for about 40 per cent of the total weight.

It was during this same summer that the Denver Zephyrs went into service on the Burlington. These trains were made up of 10 revenue body units, only



Steam Becomes Style-Conscious—The "Commodore Vanderbilt" of the New York Central
—1935

delivered in the fall of 1934. It consisted of five revenue body units and of one unit which was devoted exclusively to the 900-hp. Diesel-electric power plant and auxiliaries. Before it went into regular service, however, an additional body unit was added and the 12-cylinder Diesel engine enlarged by the addition of four cylinders to develop 1,200 hp. This train as it was originally built had a prime-mover capacity of about 4.25 hp. per ton and the motive power accounted for about one third of the total weight of the train. The ratios were not significantly changed in the modified

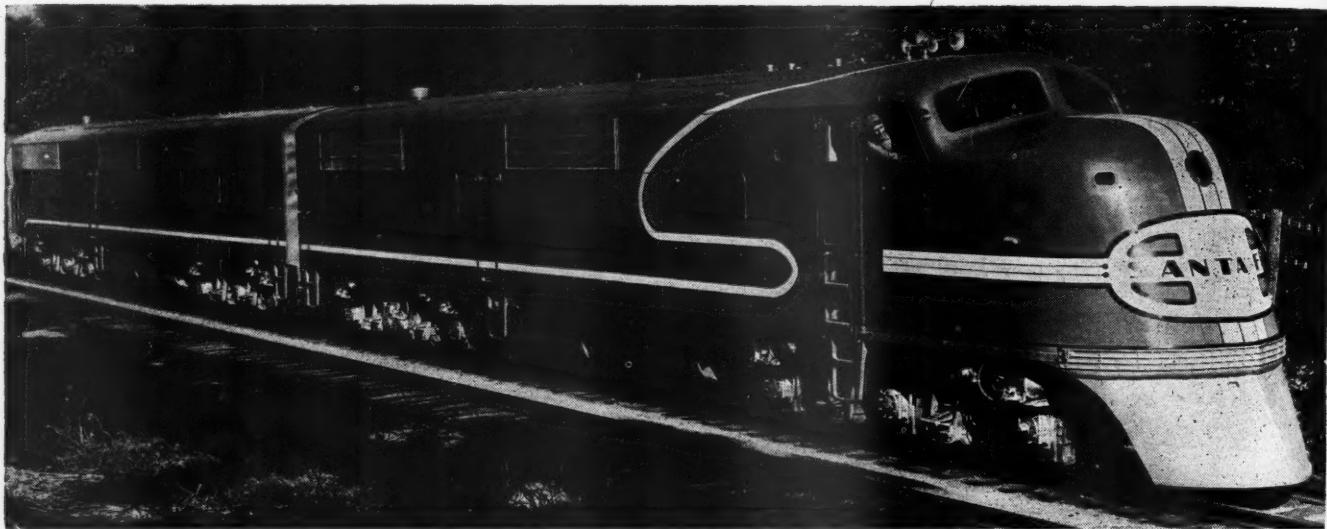
partially articulated in this case, and were hauled by a two-unit Diesel-electric locomotive, in the leading cab of which were housed two 900-hp. Diesel-electric power plants and in the second cab one 1,200-hp. power plant.

Thus, in less than two and one-half years of the streamline train development the prime movers included a 900-hp. V-12 two-cycle Diesel-electric plant and a 1,200-hp. V-16 power plant, in addition to the original 600-hp. Diesel-electric power plant, all with 8-in. by 10-in. cylinders and rated at a crankshaft speed of 750 r.p.m. These Electro-Motive power plants were combined to



First of the Pennsylvania Type GG1 Streamline Electric Locomotives Which Were Placed in Service in 1935

The Santa Fe "Super Chief" Locomotive Was Equipped with Four 900-Hp. Winton Prime Movers in Two Cabs—Adapted from a Locomotive of Similar Capacity. Built in 1935



give various locomotive horsepower ratings up to 3,600.

During the year after the first streamliners were built two streamline trains were built by the American Car and Foundry Company for the Gulf, Mobile & Northern. These trains were powered by an American Locomotive Company Diesel engine rated at 660 hp. In this case the objective was not increased speed, but the replacement of the existing steam-propelled trains on the existing schedules with a more attractive and more economical service.

These trains, which were made up of the first lightweight cars in the construction of which low-alloy high-tensile steel was employed as the material of construction, consisted of three and four-cars. With the latter consist there was slightly less than 3 rated hp. per ton of gross train weight and the motive-power equipment and its housing accounted for less than one-quarter of the total weight.

Trains Get Longer

The length of streamline trains and capacity of the Diesel motive-power equipment continued to increase. At the end of 1937 new City of Los Angeles and City of San Francisco trains, each of 14 revenue body units, went into service between Chicago and the Pacific Coast over the lines of the Chicago & North Western, Union Pacific, and Southern Pacific hauled by three-unit locomotives with a prime-mover rating of 5,400 hp. Each of the three cab units housed two 900-hp. Diesel-electric power plants and was supplemented by auxiliary generating equipment of 1,200 hp. capacity for the opera-

tion of train auxiliaries which were housed in the front end of the first revenue body unit.

In 1938 the output of the Electro-Motive V-type Diesel engines was stepped up by increasing the cylinder diameter from 8 in. to 8½ in. and the full-load crank-shaft speed from 750 to 800 r.p.m. The rating of the 12-cylinder engine was thereby increased from 900 hp. to 1,000 hp. and of the 16-cylinder engine from 1,200 hp. to 1,350 hp.

Influence of the Streamliners on Steam

In the 10 years which have elapsed since the introduction of the first light-weight streamline trains 224 Diesel locomotives with rated prime mover capacities from 1,000 to 6,000 hp. have been placed in passenger service on 22 railroads in the United States. The largest single group—136 units rated at 2,000 hp. each—are in numerous cases utilized in single or double units as the service requires and some of the locomotives are also doubling in freight service.

Within a year of the appearance of the first streamliners their influence was beginning to be felt on other forms of motive power. Early in 1935 the Pennsylvania was placing streamline electric locomotives in service and the New York Central had streamlined a 2-6-4 steam passenger locomotive, which it christened the Commodore Vanderbilt.

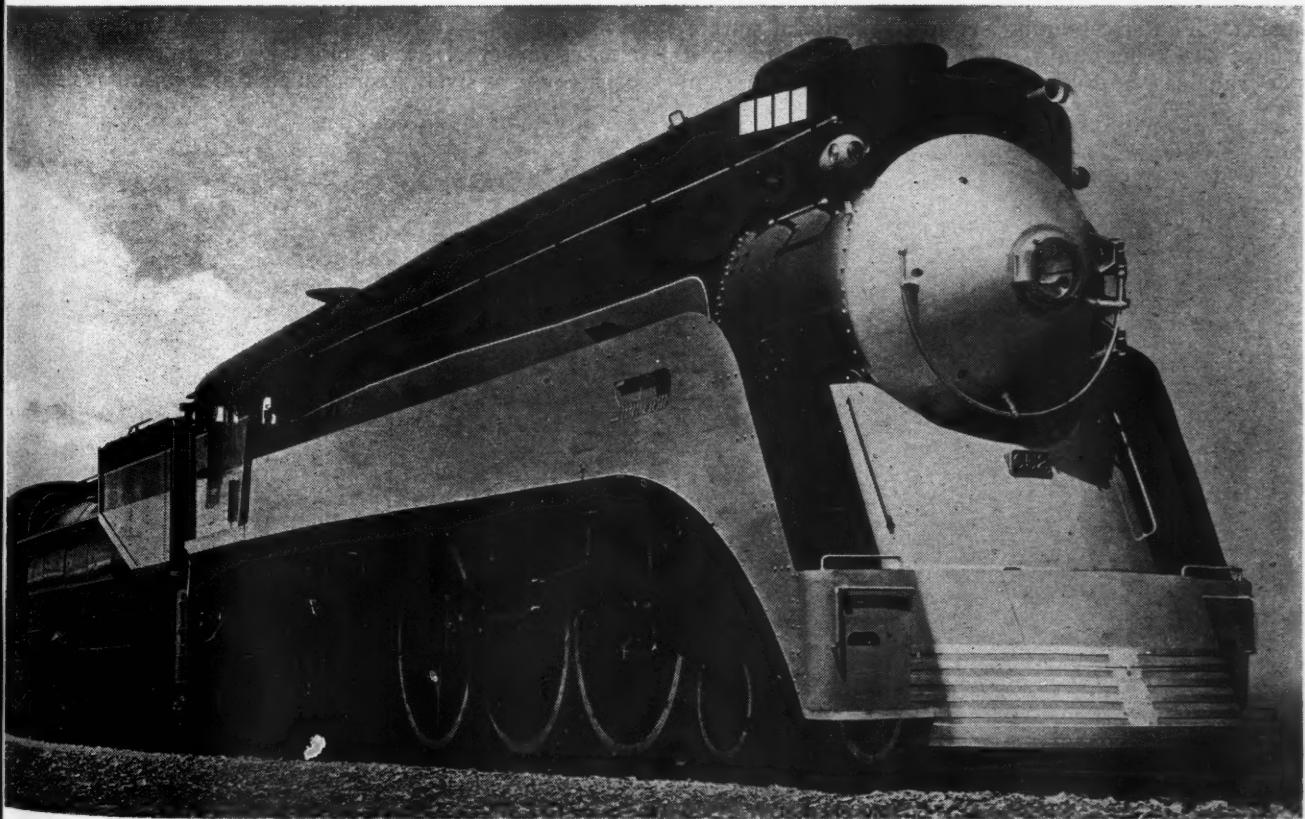
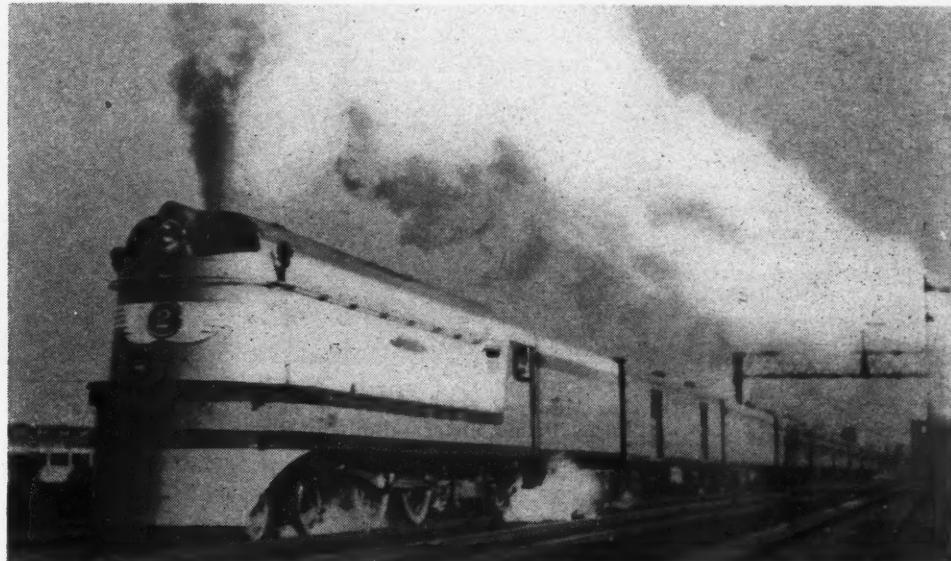
In May, 1935, the Hiawathas made their appearance on the Chicago, Milwaukee, St. Paul & Pacific—the first streamliners to be powered with steam locomotives built specifically for that purpose. Other steam-propelled

streamliners followed rapidly, including the Royal Blue and the Abraham Lincoln of the Baltimore & Ohio and the Alton, respectively, which at the outset were hauled by steam locomotives built by the railroad specifically for this service. These were built in 1935. The next year, streamlining as a style factor took hold on both the Canadian National and the Canadian Pacific in Canada and the Mercury of the New York Central System was placed in service. The Daylights of the Southern Pacific with their new streamline steam locomotives went in service early the next year, and the Crusader on the Reading near the end of the year. In 1938 came the reequipped Twentieth Century Limited

and Broadway Limited of the New York Central and the Pennsylvania, respectively. The cars in the Pennsylvania and New York Central trains were nearly one-third lighter in weight than those with similar accommodations which they replaced, a marked relief on the demands for motive-power capacity which could be utilized to improve schedules or to handle trains of increased size.

In 1934 studies of streamlining as a means of reducing train resistance at high speed were undertaken by the American Locomotive Company, the American Car and Foundry Company, and the J. G. Brill Company. These studies developed coefficients for the effect

The "Hiawatha" of the
Chicago, Milwaukee, St.
Paul & Pacific—The
First Steam Locomotive
Streamlined from Birth
—Built by American in
1935



The "Daylight" Locomotives, First Built by Lima in 1936



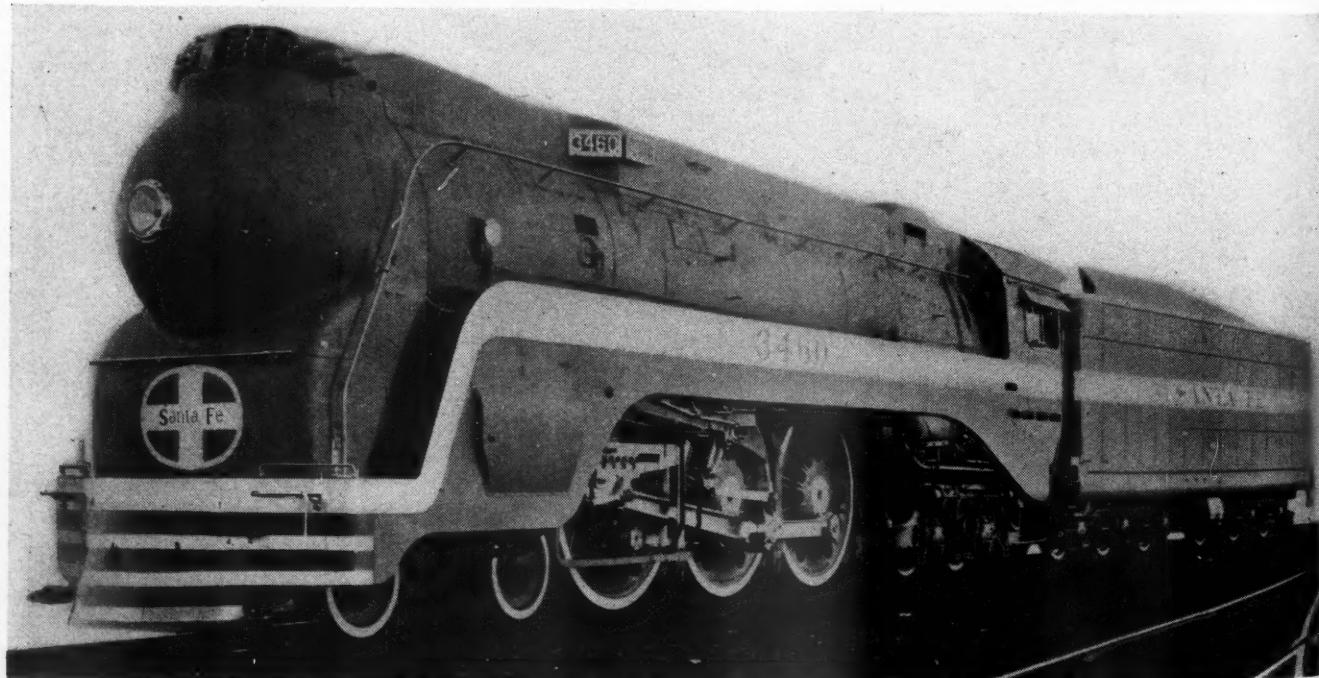
Fifty-four Hundred Horsepower in Three Cabs Containing Six 900-Hp. Prime Movers—Built by Electro-Motive in 1937

of form on head-end and tail-end resistance, the value of well-faired shields on trucks and of smooth car exteriors with continuous surfaces enclosing the space between the ends of adjoining cars.

Streamline steam locomotives have become common sights in almost every part of the United States and Canada. The streamlining serves some useful purpose in most cases, but this is more or less incidental to its style value as a traffic, rather than an operating, in-

fluence. For instance, most steam-locomotive streamlining involves some smoke-lifting arrangement, and a well-faired front end reduces head-end resistance at high speeds.

Because the early streamliners were short trains, the influence of head- and tail-end form on their total air resistance was relatively large. As train lengths increase, however, head- and tail-end air resistance becomes progressively a smaller part of total air resistance



A High-Speed Steam Locomotive for the Santa Fe "Chief"—Built by Baldwin in 1937

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while the friction of air flow underneath and along the sides and roofs of the cars becomes a progressively larger proportion of the total. At the same time, however, air resistance as a whole becomes a progressively smaller proportion of total train resistance.

Learning About Air Resistance

The inability to control the relation of the direction of movement of the train to the direction of natural winds also adds to the difficulty of appraisal of the economic value of the effect of full streamlining.

The results of wind-tunnel tests combined with experience have established the following general conclusions: The air resistance of a steam locomotive can be reduced by fairing the front end and top of the boiler. A tender perimeter smoothly connecting the back of the cab with the front of the first car materially reduces the air resistance of that vehicle. Flush windows, smooth outside surfaces, including under-body attachments, and the absence of hoods at the ends of the car, with or without closures forming continuous surfaces between cars, and well-faired tail ends are becoming established practice and all contribute to an appreciable reduction in passenger-train resistance. This is, in turn, a valuable supplement to reduced car weight in keeping down the demands on locomotive capacity for high-speed passenger-train service.

One influence of the streamliners was the interest their service aroused in the relation of train weight and horsepower as a factor affecting top operating speed. In October, 1938, the A. A. R. undertook a series of steam-locomotive trials on three railroads to determine the maximum drawbar horsepower required to operate a 1,000-ton passenger train at a speed of 100 miles an hour on level, tangent track. The capacity to maintain this top operating speed was considered sufficient to maintain satisfactory high-speed operating schedules.

These tests showed that after a 1,000-ton test train had been accelerated to a speed of 100 miles an hour, it required 3,379 adjusted drawbar horsepower to maintain that speed on level tangent track. The calculated speed-distance curves for the acceleration of the 1,000-

ton train showed that a locomotive developing a maximum of 5,000 drawbar horsepower required 0.93 miles to accelerate to 50 miles an hour; an additional 4.4 miles to accelerate to 80 miles an hour, and an additional 29 miles to accelerate to 100 miles an hour. These facts are striking illustrations of the importance of light weight in passenger trains built to operate on fast schedules.

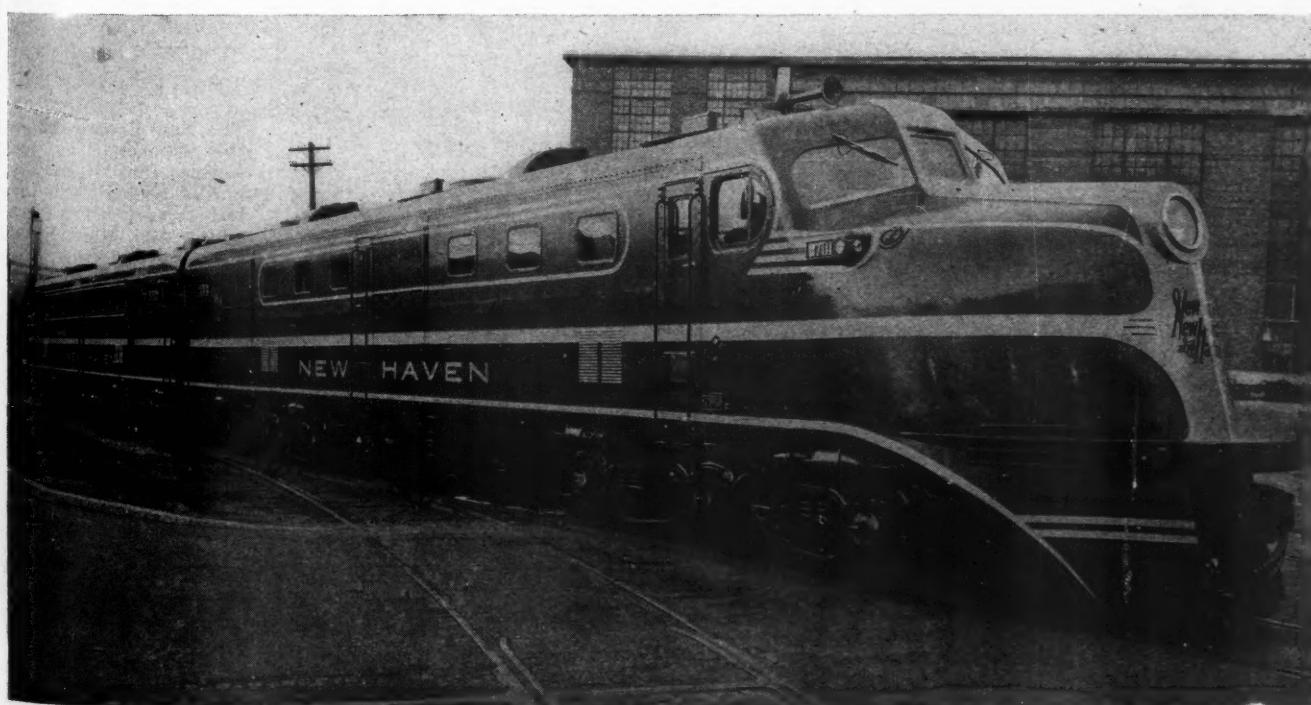
Credit cannot be given to the streamliners alone for changing the direction of steam-locomotive development. The two great influences affecting locomotive development during recent years are the demand for increased reliability caused by the movement for longer runs and increased utilization which began more than 20 years ago, and the steady pressure for greater horsepower output which has tended toward greater locomotive weight efficiency.

While not directly responsible for either of these influences, the "Decade of the Streamliners" has exerted an accelerating effect on both of them and has stimulated interest in other types of locomotive prime mover, such as the steam turbine and the gas turbine.

Conclusion

The decade following the end of World War I was one of marked improvement of railway motive power. This was, no doubt, partly due to psychological causes brought about by the war and partly because of a dammed up demand for new locomotives. The same forces may be expected to act following the close of World War II, but with the added factors of the demonstrated value of the new ideas in passenger transportation formulated during the Decade of the Streamliners and a disturbingly certain new source of competition. It will be a period in which new ideas will come to trial and in which the existing forms of motive power will be subjected to further intensive development.

These Two-Unit, 4,000-Hp. Locomotives Move Passengers by Day and Freight by Night—First Built for the New York, New Haven & Hartford by Alco-G. E. in 1941



Highway Bridge of Special Design

Concrete overcrossing is of rigid-frame construction with suspended section in main span supported on cantilever arms

INNOVATIONS in both design and construction are represented in a reinforced-concrete overhead highway bridge that the Pennsylvania has constructed across its tracks near Aberdeen, Md. In design, the structure is worthy of mention because the center portion of the main span consists of a concrete slab that is suspended from cantilever arms projecting from rigid-frame end spans. Regarding the construction methods employed, the project is of interest mainly because the concrete for the suspended section of the main span was placed in a form that was hung from beams spanning between the cantilever arms.

The new bridge is located about a mile north of Aberdeen, where it carries a highway across the tracks of the company's electrified main line between New York and Washington, D. C. Originally, the tracks were crossed at this point by a three-span bridge in which the main span, consisting of deck-girder construction with a timber deck, had a length of 42 ft. and was carried on concrete piers. Since the company now has under way a project to construct a third track at this location, it became necessary to replace the old bridge, and in so doing it was desired to provide a structure capable of accommodating not only the three tracks but a possible future fourth track as well.

The design of the new bridge was influenced by a number of considerations. In providing the longer span

needed, for instance, it was necessary to keep the depth of the floor to a minimum in order to obtain the maximum underclearance and to avoid the necessity of raising the profile of the roadway. The latter stipulation was imposed by the fact that the approach grades were already quite steep, being seven per cent from the east and nearly six per cent from the west, and it was obviously not desirable to increase them further. The proximity of an intersection of the roadway with an important highway on the west side of the tracks precluded the possibility of extending the approach on that side for the purpose of reducing the grade. Still another consideration was the fact that the foundations of the bridge would be on a mixture of sand and gravel, and not on unyielding material. A final condition was the necessity of adopting a design involving minimum use of critical materials.

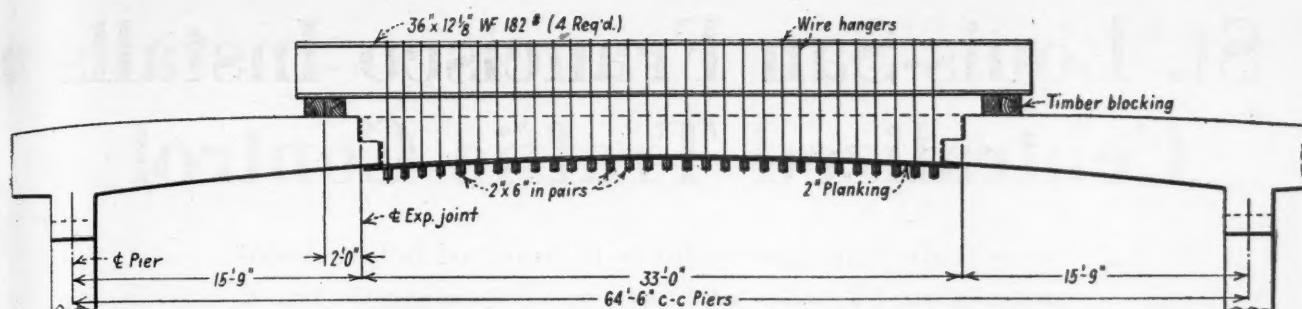
Considering all these factors, it was decided that the best results would be obtained with a reinforced concrete structure consisting, as indicated previously, of two rigid-frame approach spans with cantilever projections carrying a suspended section of the main span. Not only did such a design permit the floor depth to be kept within the desired limits, but it was such that the deck could be accommodated to the contour of the vertical curve of the roadway, with the result that an underclearance somewhat greater than the minimum was obtained at the center of the main span. A half-through girder span would have had about the same floor depth as the design chosen, and the girders could have been cambered as desired, but a second-hand steel span with the necessary qualifications was not available, and the use of new steel not only would have been more costly but was questionable from the viewpoint of obtaining the necessary priorities. Finally, by designing the main span with a



The New Bridge Before the Shoring for the Forms Had Been Removed and Before the Balustrades Were Placed on the Main Span. Beams Carrying the Suspended Span Are Still in Place



Showing the Beams With Their Wire Tie Hangers for Supporting the Form for the Suspended Section of the Main Span



Above—Partial Longitudinal Section on the Center Line of the Bridge Showing the Method of Supporting the Center Portion of the Main Span During Erection. Right—Close-Up Construction View of a Portion of the New Bridge

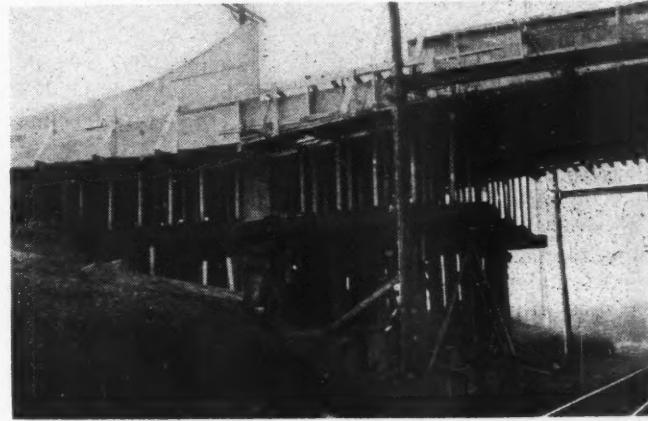
suspended section, rather than as a rigid frame, a structure was obtained that is capable of withstanding movements of the footings that might cause severe stresses to be set up in a fully continuous structure.

The bridge that was designed for this location has a main span 64 ft. 6 in. long between the pier centers, and flanking spans 35 ft. long. Each of the two piers consists of a three-column bent on a continuous spread footing, while the end abutments, because of the rigid-frame design, consist merely of simple walls of constant thickness and have parallel wingwalls. The deck of the bridge provides a roadway 22 ft. wide with a 1 1/2-in. crown, and has a 1 1/2-in. mastic wearing surface. Along each side is a curb 10 in. high, which is surmounted by a solid concrete balustrade 6 in. thick. On the main span, the height of the balustrade is 6 ft. 6 in., to provide the necessary protection due to the electrification system, and from the ends of this span it decreases in long sweeping curves to 3 ft. on the approach spans. On the wingwalls, the balustrades are 3 ft. 1 1/2 in. high.

The cantilever portions of the main span project 15 ft. 9 in. from the center lines of the piers, and each projection is rabbetted at its outer end, except at the curbs, to provide a shelf 14 1/2 in. wide, which serves as the support for the corresponding end of the suspended section. The latter section is 33 ft. long and each end is counter-rabbetted to form a projecting lip that engages the supporting shelf of the corresponding cantilever section. At the curbs the cantilever arms and the suspended section come together in plain butt joints to form lugs on the suspended portion that prevent lateral movements.

All adjoining vertical faces of the concrete at the joints are placed 1/2 in. apart to allow for expansion and are filled with joint mastic, and the upper part of each joint is closed with a metal water stop. As a further precaution in the event that water should gain access to the joint, two 1 1/2-in. wrought iron weep pipes are inserted through the projecting shelf comprising the lower part of each joint, and the surface of the shelf is pitched slightly toward these outlets. To prevent the weep pipes from becoming clogged with concrete during the placing of the suspended section, they were each covered with a piece of plywood held in place by a length of wire extending through the pipe to an anchor at the lower end. The horizontal surfaces of the joints are separated by a thickness of tar paper.

The deck of the main span of the bridge ranges in depth at the center line from 3 ft. 9 in. at the piers to 2 ft. 3 in. at the center, and is so arched that the soffit at the center is slightly more than two feet higher than at the piers. Hence, while the underclearance is 20 ft. above the top of rail at the center lines of the two outer tracks, it increases to 20 ft. 8 in. over the two inside tracks.



In the construction of the bridge, the end spans, including their cantilever arms, were built first, and in this work it is interesting to note that the lower portions of the concrete columns comprising the old bents were used as foundations for the timber shoring carrying the forms for the cantilever arms. However, the placing of the concrete for the suspended section of the main span provided the most interesting phase of the construction work. Since it would have been impracticable to support the form for this section from underneath, a scheme was adopted for suspending it from the cantilever projections. This involved the use of four 36-in., 182-lb. wide-flange beams, arranged on 6-ft. 9-in. centers, which were placed to span the gap between the ends of the cantilever arms, with their ends raised somewhat on blocking. The form itself was of timber construction and consisted of a series of joists placed transverse to the roadway and covered with a deck of 2-in. planking. The joists were placed on 14-in. centers and each of them consisted of two 2-in. by 6-in. timbers so arranged as to leave space for a bolt to be inserted between them.

Wire hangers were used for suspending the forms from the wide-flange beams. Each of the hangers consisted of a length of wire in the form of a loop with the ends welded to a wire coil or helix. These loops were placed around the beams at the locations of the joists, and screw bolts were inserted through the joists from the underside in such a manner as to extend into the wire coils.

With this device, the floor of the form could be adjusted to fit the soffit of the arch by turning up the screw bolts as necessary. In order to maintain the form to the proper contour during the placing of the concrete, timber blocks were inserted under the beams at the hangers as required, and were removed as the concrete was placed. When the form was removed, the hanger wires at the top of the concrete were burned off, and the screw bolts below were removed. Incidentally, it will be noted that the form for the concrete served also as a shield to protect the catenary wires.

St. Louis-San Francisco Installs Centralized Traffic Control

Saves train time and reduces number of helper locomotives on 47 miles of heavy grades on single track

THE St. Louis-San Francisco has installed centralized traffic control on 47 miles of single track between Dillon, Mo., and Swedeborg, on the line between St. Louis and Springfield, Mo., Dillon being 105.6 miles west of St. Louis. This installation was made to increase track capacity and save train time in a territory where heavy grades and curvature reduce train speeds as well as require extra movements of helper engines.

Between St. Louis and Springfield, 239 miles, the St. Louis-San Francisco crosses the Ozark mountains, the line being located for the most part on ridges with comparatively light rolling grades, an exception being the section between Dillon and Swedeborg where the line descends to a crossing of the Gasconade river, and then climbs back to the top of a ridge again. Starting at M. P. 107.5, about two miles west of Dillon, the grade descends westward to M. P. 117 at Piney. Between Dillon and M. P. 111 at Rolla, the grade varies from 0.08 to 1.04 per cent and from Rolla west for 6 miles, it varies from a minimum of 0.8 per cent to a maximum of 1.8 per cent. Furthermore, within this 6 miles there are 13 curves, including one 6 deg., one 5 deg., four between 4 deg. and 4 deg. 30 min., five between 3 deg. and 3 deg. 30 min., and two 2 deg.

Between M. P. 117 and M. P. 125 at the west end of Jerome, the line follows the valley of the Little Piney river and crosses the Gasconade river, with comparatively light grades and curvature. Beyond Jerome, the grade ascends westward to M. P. 133.5 near Dixon Wye, with the exception of 2,800 ft. of 0.5 per cent descending grade between M. P. 131 and 132. The grade is broken, with 1.88 per cent for 3,900 ft., 2.06 per cent for 1,100 ft., and 2.54 per cent for 700 ft. The curvature is very sharp,

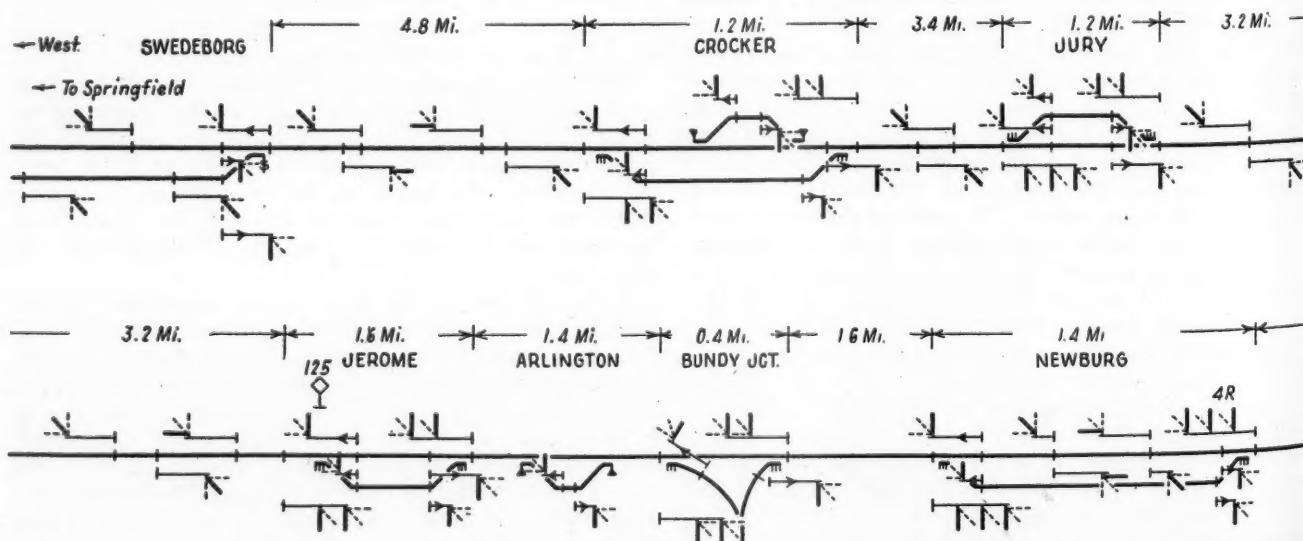
including four 3 deg., one 4 deg., four 5 deg. four 6 deg., twelve 8 deg., and two 10 deg. curves. As a result of the heavy grades and curvature, through freight trains, as well as passenger trains with more than 10 cars, require helper locomotives eastward from Newburg to Dillon and westward from Newburg to Dixon Wye.

Between Dixon and Swedeborg, the grade is rolling, with the longest and steepest grades ranging from 0.83 to 1.38 per cent ascending eastward for about 2 miles between M. P. 139.5 and 141.5. Helper service is provided for heavy tonnage freight trains eastbound between Jury and Helm.

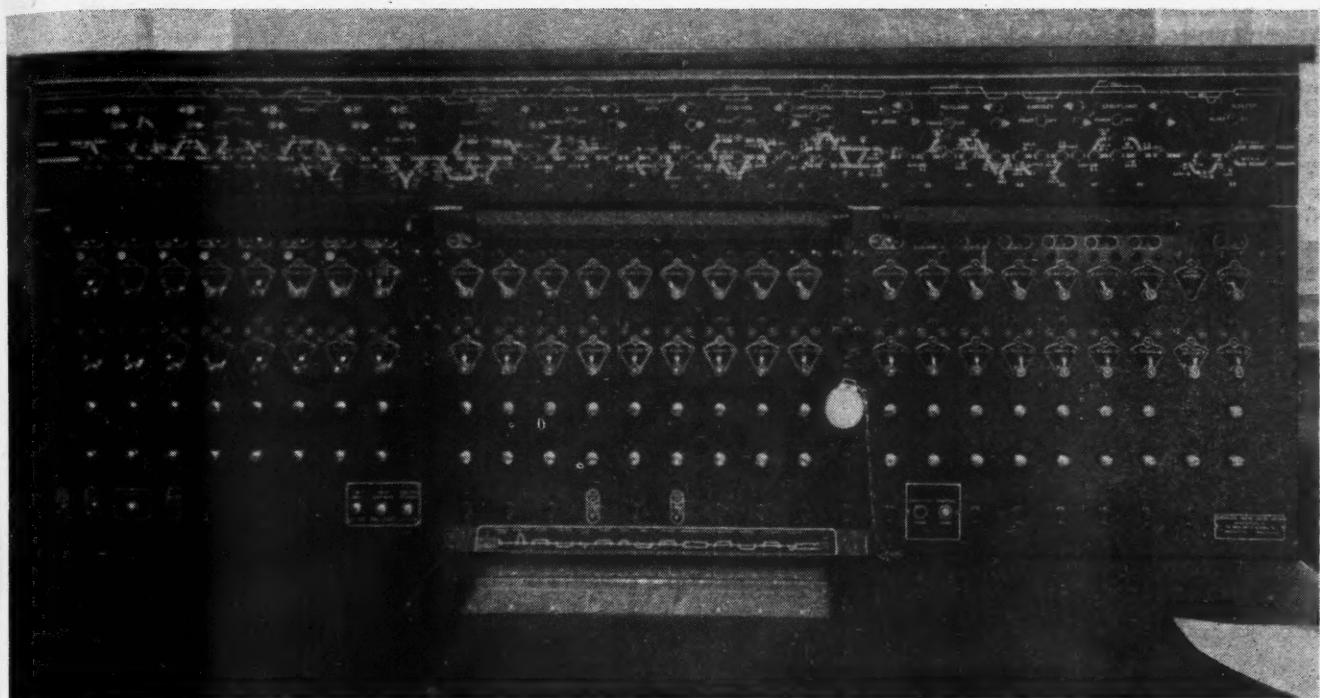
Up to 68 Trains Daily

Newburg, approximately 14 miles from the east end of the C. T. C. territory, is a sub-division point where freight trains enter and depart from the yard. The schedules include five passenger trains each way daily between Dillon and Newburg, and four passenger trains each way daily between Newburg and Swedeborg. Counting additional sections of regular trains and extra trains, the normal traffic is now about 16 passenger trains daily. In addition, four fast through freight trains are scheduled in each direction daily, and, counting extra trains, a typical day included 13 freight trains westbound and 18 eastbound. A local freight train is operated eastward on Monday, Wednesday and Friday, and in the opposite direction on the three other days of the week, excluding Sunday. The number of helper locomotives varies with traffic.

Following the installation of the C. T. C., there has been considerable saving in helper expense; for example, in the month of July, 1943, before C. T. C. was installed,



Track and Signal Plan of the C. T. C. Territory



The C. T. C. Machine Is in the Dispatcher's Office in Newburg

the number of helper engine crew shifts worked was 493, the number of trains helped per engine averaged 2.63, and the average time of engines on duty was 8 hours 56 minutes. In January, 1944, after the C. T. C. was placed in service, the number of helper engine shifts worked was 473, the number of trains helped per engine averaged 2.67, and the average time that engines were on duty was 8 hours 5 minutes. After the dispatchers become thoroughly familiar with C. T. C. system, additional saving will be made. On a typical day in October, a total of 47 through train and 21 light engine movements were made on this territory.

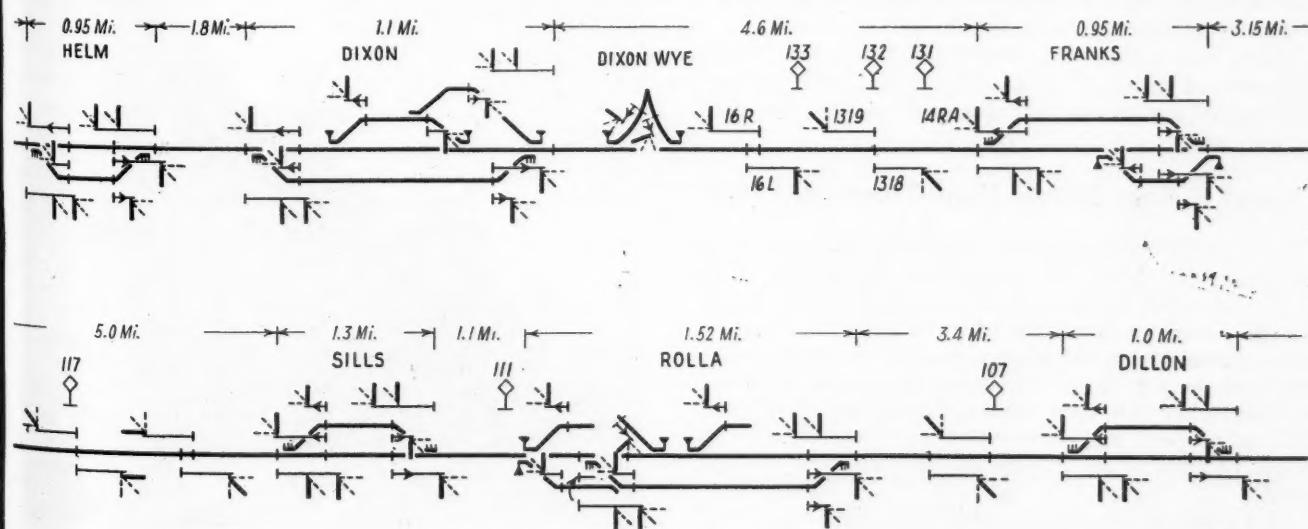
Why C. T. C. Was Installed

Prior to the installation of centralized traffic control, train movements in this territory were authorized by timetable and train orders, with automatic block signal protection. Hand-throw switch stands were in service

at the passing tracks, at the yard lead switches at Newburg, and at the wye switches at Bundy Junction and Dixon Wye.

As traffic increased during 1942, delays to trains became excessive on the sections between Dillon and Swedeborg. This heavy increase in normal traffic was complicated by many short movements between Newburg and Bundy Junction, 2.4 miles west, at which point a branch line turns off to Fort Leonard Wood. Furthermore, if trains did not leave the yard at Newburg when planned, or did not make the time anticipated by the dispatcher, the entire operation was disrupted because there was no opportunity to issue and deliver new orders in time to take advantage of changing conditions.

On account of the heavy grades and curvature, train speeds are low in both directions in this territory, a fact which increases the time-distance between trains and thereby limiting the track capacity. Furthermore, trains lost a great deal of time stopping on grades to permit the



Between Dillon, Mo., and Swedeborg

operation of hand-throw stands when entering and leaving sidings. When trains were numerous, there was little opportunity to move the helper locomotives back from the tops of the grades to Newburg. As a result, these locomotives and crews lost much time waiting at the tops of the hills. In numerous instances trains ready to depart from Newburg had to wait for helper engines to return to Newburg from Dixon Wye or Dillon. Therefore, the congestion between Dillon and Swedeborg limited the capacity of the entire line between St. Louis and Springfield as well as to points in Oklahoma, Arkansas and Texas. It was concluded, therefore, that centralized traffic control should be installed as soon as possible. The C. T. C. was completed and placed in service in short sections between August 27, and December 24.

Changes in Passing Tracks

As a part of this work, changes were also made in passing tracks. Short passing tracks at Piney, midway between Sills and Newburg, and at Hancock, midway between Helm and Jury, were removed. At Franks and at Dixon there were formerly two passing tracks, one for eastward trains and one for westward. At Franks, the eastward siding was lengthened to 112-car capacity and is now used by trains of both directions, with the previous westward siding reserved for use in emergencies and by local freight trains. At Dixon the eastward siding was lengthened from 81 cars to 112 cars and is now used by trains in both directions, while the 62-car eastward siding is left in service for use in emergencies and by the local freight trains. The 83-car single siding at Jury was lengthened to 130-car capacity, the 81-car siding at Sills was lengthened to 148 cars, and the 71-car siding at Rolla was lengthened to 161 cars. The turnouts at all passing sidings are No. 10.

As a part of the centralized traffic control project, power switch machines were installed at both ends of the single sidings at Dillon, Rolla, Sills, Jerome, Franks, Dixon, Helm, Jury and Crocker. At these switches the conventional arrangement of C. T. C. semi-automatic signals were installed to direct trains to (1) Proceed on the main track, (2) Enter the siding, or (3) Depart from the siding.

At Newburg, power switch machines were installed at both ends where the yard leads connect with the main line. All freight trains enter and depart from the yard through these switches. The intervening 6,700 ft. of main track through Newburg is excluded from C. T. C. territory and within these limits, all trains are required to operate at speeds of 15 m. p. h. or less, with automatic block signal protection provided as shown on the accompanying plan.

Short Sidings Retain Hand-Throw Switches

If a westbound passenger train, for example, is approaching Newburg, the dispatcher, by means of the C. T. C. control, can control westward signal 4R to clear the top "arm" to direct the train to move to the station under automatic signal protection. If the block is occupied and the top "arm" of signal 4R cannot be cleared, the dispatcher can then control signal 4R to display a "call-on" aspect, red-over-red-over-yellow, to allow the westward train to advance on the main track at restricted speed.

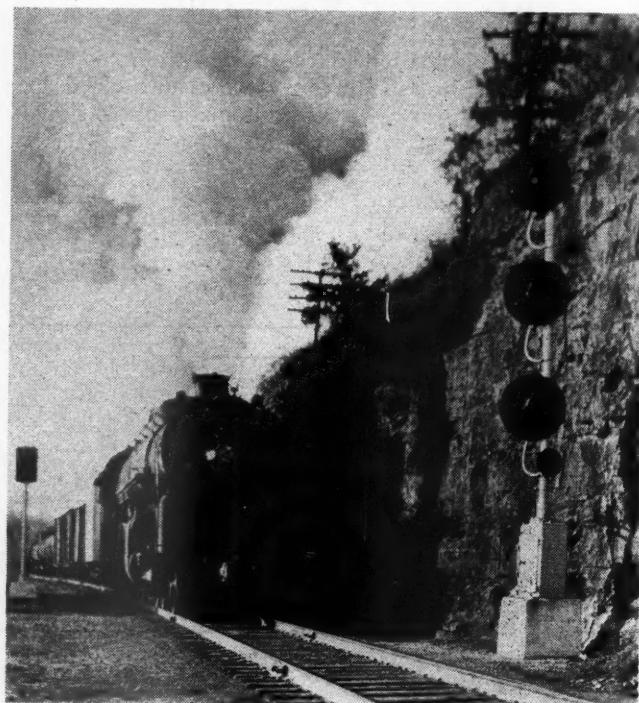
At various short sidings, which are used only by the local freight trains, by work trains, or in emergencies by through trains, the hand throw switch stands were left in



Passing Track Switches Are Operated by Electric Switch Machines

service and electric locks were installed on these switches as a part of the C. T. C. protection, a total of 15 such switches being included in the project. At each of these locations, a dwarf signal is located opposite the fouling point to govern train movements from the siding to the main track. A track circuit three rails in length is located just ahead of the switch, and occupancy of this track section releases the electric lock and permits trains to enter the side track with minimum delay.

The C. T. C. control machine is located in the dispatcher's office at Newburg, in a new 20-ft. by 45-ft. one-story fireproof building, of concrete and brick. The illuminated track diagram near the top of the panel in-



Eastbound Freight Train Leaving Newburg

cludes a track-occupancy indication lamp to repeat each OS switch detector track circuit, to repeat each section of signal-track main line opposite a siding, and to repeat each station-to-station block between two sidings. In a vertical line above each of the station-to-station block-occupancy lamps there are two white lamps, the lower one with an arrow pointing to the right (westward) and the upper one with an arrow pointing to the left (eastward).

When traffic direction is established for a given station-to-station block, the corresponding traffic lamp is lighted and remains lighted until the traffic direction is changed.

After a station-entering signal has been cleared and a train has accepted and passed that signal, the traffic direction cannot be changed until the train departs from the station-to-station block.

A time code system, including two line wires, is used to send controls from the office to the various outlying power switches and semi-automatic signals, as well as to return the indications to the control machine. A telephone circuit is superimposed on the C. T. C. code line.

Changes in Signals

The old semaphore automatic block signaling on this territory had been in service since 1910. These mechanisms were worn to such an extent that, when installing the C. T. C., the semaphores were discarded and new searchlight type signals were installed. The old mechanism cases were retained for use as instrument cases, the masts were cut to the proper height for mounting

the new searchlight signals, and the old ladders were shortened. The old signaling had been arranged and controlled on the overlap principle, which required more intermediate signals under certain circumstances than the new intermediate signaling in the C. T. C. system. As a result, all of the signal locations were moved, which required new concrete signal foundations.

Searchlight Units

One three-aspect searchlight unit is used for each intermediate signal, for each main-line station-departure high signal, and for each leave-siding dwarf signal. As a general rule, each station-entering high signal has two searchlight units, the second "arm" normally displaying red except when the switch is reversed and the red-over-yellow aspect is displayed to direct a train to enter the siding. The station-entering signals at Newburg each have a third searchlight unit which is normally red, but is used to display the "call-on" aspect, red-over-red-over-yellow. Each C. T. C.-controlled semi-automatic signal is absolute and is so designated by a letter "A" on the mast.

This C. T. C. installation was planned and installed by signal forces of the St. Louis-San Francisco under the direction of R. W. Troth, signal engineer, the major items of equipment being furnished by the Union Switch & Signal Company. At the present time the project is being extended west 22 miles from Swedeborg to Sleeper, so that the entire territory between Dillon and Sleeper, 69 miles, will all be controlled from the C. T. C. machine at Newburg.

Communications . . .

Why Use So Few Routes for Through Passenger Runs?

EASTON, PA.

TO THE EDITOR:

From the pages of your magazine it is evident that there is considerable thought being given in railroad circles to the need for improvements to meet the post-war competitive situation in passenger travel. Attention seems to be focused especially on the design of equipment and on rates per mile. We wonder why there is little or no discussion of the question of routing?

We have here at Easton, Pa., what might be called reasonable railroad passenger service to New York City, Harrisburg, Wilkes-Barre, Rochester, and Buffalo, and that's about all. It is my impression that our town is located in the shortest railroad mileage between New York City and Pittsburgh, and so are Bethlehem, Allentown, and Reading. Can you think of a good reason why not a single one of the passenger trains between New York City and Pittsburgh runs through these cities?

Many passengers, as you railroaders are doubtless well aware, dislike to change trains en route and are afraid of big terminals. Through the streets of our town run buses marked "Pittsburgh" and other distant points.

We know the buses are not particularly comfortable, but we can board the vehicle at a handy point in our town and we can get off in Pittsburgh, taking our choice of several schedules. Or we can drive in our private car going most of the way over the new turnpike.

It happens that we like to visit the town of Springfield, Ohio, another average town, located on the shortest railway mileage between Columbus, Ohio, and Dayton, Ohio. There are many trains from Pittsburgh and points east running through Columbus and Dayton. Why do none of them go through Springfield?

A glance at the map shows that the distance from New York to Los Angeles is shorter via St. Louis than by Chicago. Why is there no good connecting service, not to mention any through service, via St. Louis?

How about the *Railway Age* opening up on this question?

E. STANLEY GRANT.

Why Space Reservations?

PITTSBURGH, PA.

TO THE EDITOR:

It seems to me that the railroads have been criticized more than they deserve for the way Pullman reservations are being handled. I have a plan which would eliminate all of this ill will and a brief order for regulation from the O. D. T. would put it into effect overnight.

My idea is for the O. D. T. to put out instructions forbidding the railroads to make Pullman reservations. Travelers contemplating a trip would be obliged to go to the railroad office, inquire for the desired space and, if available, purchase the railroad and Pullman ticket on the spot. Further, the railroads would be instructed by the O. D. T. not to refund money on Pullman tickets but, of course, they could redeem railroad tickets. This would mean that if a traveler changed his plans, he would be obliged to sell his Pullman ticket to another traveler or lose the value of the ticket.

I believe such a plan would eliminate the possibility of hotel porters and others reserving blocks of tickets and put the traveling people on the basis of first there, first served. If you agree with me, I think you will be doing the country a great service if you endeavor to put this plan into effect.

SHIPPER.

Railroads-in-War News

O. D. T. to Have Two Assistant Directors

McCarthy, Richardson chosen; Rogers quits O. D. T.; Young remains deputy director

Administrative changes in the Office of Defense Transportation announced April 15 by Director J. Monroe Johnson will result, it was explained, in a consolidated direction of certain divisions whose functions are closely allied. This was brought about by the appointment of two assistant directors, both in charge of two divisions heretofore independent of each other in the O. D. T. organization.

At the same time it was disclosed that Interstate Commerce Commissioner John L. Rogers had on March 20 tendered his resignation as assistant director of the O. D. T., in order to devote his energies to his commission duties. Pending the appointment of a successor to the late Director Joseph B. Eastman, who died March 15, Mr. Rogers had continued in charge of the work and personnel of the O. D. T. Division of Motor Transport, however, and Colonel Johnson, in expressing his regret that the O. D. T. was to lose the services of Commissioner Rogers, pointed out that he would remain available in an advisory capacity.

Enlarged Administration Staff—The newly-appointed assistant directors are Henry F. McCarthy and Guy A. Richardson. Repeating earlier statements to the same effect, Director Johnson said that Brig. Gen. Charles D. Young would continue to hold the post of deputy director of the O. D. T., the position he occupied when Mr. Eastman was director. As noted in *Railway Age* last week, page 737, Joseph L. White is continuing as executive officer, being in charge of administrative matters and statistical services, while Homer C. King has been appointed executive assistant to the director, having been granted a leave of absence from his I. C. C. post as director of the Bureau of Service, so that the O. D. T. administrative staff has been still further enlarged and realigned in the creation of the two assistant directorships.

Mr. McCarthy will be in charge of the Division of Railway Transport as well as of the Division of Traffic Movement, of which he had been director. Thus, it was explained, administration of the latter division, which studies traffic flow and formulates policies concerning freight and passenger movement, will be consolidated with the O. D. T. division which carries out many of those policies, and which was in charge of Victor V. Boatner, director until his recent resignation, and of James H. Aydelott, acting director, who plans to return to his posi-

tion as general manager, lines East, of the Chicago, Burlington & Quincy, as soon as he can be released by the O. D. T.

With O. D. T. Since Organization—The new assistant directors have been with the O. D. T. since its organization was completed in January, 1942. At that time Mr. Richardson was appointed director of the Division of Local Transport and Mr. McCarthy was made assistant director of the Division of Traffic Movement, from which post he was advanced to the division directorship in May of the same year, filling the vacancy left by the transfer of John R. Turney to the directorship of another division, later eliminated.

Colonel Johnson explained that Mr. Richardson's appointment will consolidate under an assistant director the O. D. T.'s wartime controls over truck, intercity buses, street car lines, urban rapid transit, city buses, city delivery service, and taxicabs, since he will be in charge not only of the Division of Local Transport, but also of the Division of Motor Transport. He formerly was president of the Chicago Surface Lines and of the American Transit Association. Harold C. Arnott, director of the Division of Motor Transport, will continue in that capacity, it was stated.

New Transportation Director Named by W. F. A.

The War Food Administration on April 15 announced the appointment of Elwood Chase of Buffalo, N. Y., as director of transportation, replacing Mark Upson, who has resigned to return to his former position in private business at Cincinnati, Ohio.

A native of Maryland and a graduate of the college of agriculture at Cornell University, Mr. Chase, according to the W. F. A. announcement, has been for the past 20 years in the grain and feed business at Buffalo, where he has been associated with the Cooperative G. L. F. Mills, Inc. Recently he has represented the grain and feed industry on the Lower Lakes Grain Committee sponsored by the Department of Agriculture, and as chairman of this committee has worked with the W. F. A. transportation staff on problems affecting grain movements on the lakes.

As reported in *Railway Age* of February 12 and 19, pages 358 and 395, respectively, Mr. Upson's association with the W. F. A. was marked by the development of the controversy over the diversion of United States railroad cars to Canada for the movement of feed grain into this country at a time when country elevators in the Northwest were said to be blocked for lack of cars to move domestic grain.

In correspondence and in Senate committee hearings W. F. A. transportation activities in this connection were subjected to sharp criticism by Interstate Commerce Commissioner J. Monroe Johnson, Senator Reed of Kansas, and others.

"In Lieu" Wage Raise

Defended by Vinson

Stabilizer replies to critics of actions in railway and coal cases

Criticism of the Administration's wage stabilization program stems "in the main from the coal and railway cases and much of it is based upon misunderstandings," said Fred M. Vinson, director of the Office of Economic Stabilization in an April 1 address at the University of Pennsylvania's Wharton School of Finance and Commerce Philadelphia, Pa.

"Even if those cases were not wholly free from criticism," Judge Vinson suggested that the stabilization policy should not be judged "by the most difficult instances of its application"; for "one swallow does not make a summer," nor do "two locusts make a plague."

Accepts W. L. B. Choice—It seems to the O. E. S. director that the "sole basis for criticizing the coal case would be a disagreement with the fundamental policy of allowing in wartime changes in the base upon which pay is computed." For himself, he accepted the National War Labor Board's choice in favor of the change, "because, under the Fair Labor Standards Act it had determined that pay must be computed upon the new basis."

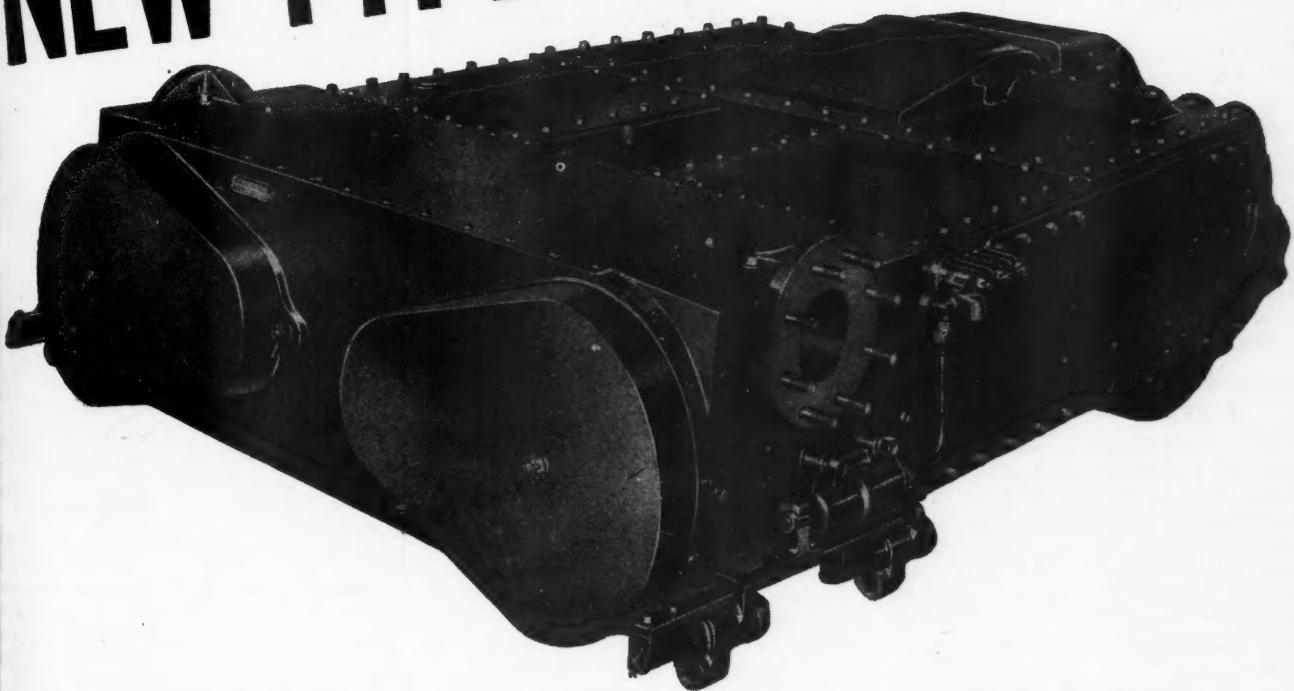
"The railway case, likewise, has the same policy question of whether there is to be any change on the basis of pay during wartime," Judge Vinson went on. "Originally the non-operating railway employees demanded a 20 cent per hour increase, and the operating employees demanded a \$3 day increase. The emergency board, in the non-operating case, recommended an 8 cent per hour increase. I found that I could not approve this recommendation under any of the standards which I have outlined to you. It was a general across-the-board increase and, as I have said above, the one standard which permits such an increase is the 'Little Steel' formula. These employees had received all they could receive under that formula."

Reviews Controversy—"After my decision in this case, the emergency board hearing the operating employees' case limited them to 4 cents per hour, which was the amount which could be given them under the Little Steel formula."

"As you know, neither group of railway workers was at all pleased with this result. Later, a special board established by the President, following the standards of the stabilization program, recommended a 10 to 4 cent adjustment based on the standard and interrelated job classification test. This I found permissible under the

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exhaust passages. Dynamic balancing for smooth operation at higher speeds. A roller bearing crankshaft for long life with minimum maintenance. A new air control permitting engagement at higher speed. A new design of ball joint with self-adjusting packing and large passage areas. The selection of the proper gear ratio for each given boiler pressure, wheel diameter, and adhesive weight.

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stabilization program. Still, the employees were not satisfied.

"The non-operating employees took their case to Congress; both groups of employees took a strike ballot and called a strike. Meanwhile, the employees had made further claims on the basis of the fact that they did not, as do other workers, receive overtime after 40 hours per week. After the strike call was made and the President was doing his best to work out a settlement with the parties, the government found it necessary to take over the railroads in order that there would not be a stoppage of transportation during war. After the railroads had been taken over, a solution was reached. It was satisfactory to the carriers, to the 20 railway unions involved, and to the government. The basis of the wage adjustment was an increase of 5 cents per hour in lieu of overtime pay. That meant that the net wage increase for the operating employees was 9 cents, and it was 11 to 9 for the non-operating employees, with the lower paid workers receiving the 11 and 10 cent increases.

Calls Decision Reasonable—"A policy could be followed which provided that no change whatsoever can be made in the basis of pay during wartime. The administration chose the other alternative. The vast majority of workers in this country receive overtime pay after they have worked 40 hours per week. The railway employees did not. In view of the fact that it was difficult to work out literal overtime for railway employees, then it was reasonable to give them the equivalent in lieu of actual overtime."

Claims Handling Allowance on Army Pier Freight

Attorney General Biddle announced April 15 that the Department of Justice had on that day filed a complaint with the Interstate Commerce Commission seeking "repairs and other relief" from 443 railroads participating in the movement of freight delivered to the Army Base piers 1 and 2 at Norfolk, Va., in which the claim is made that the federal government is entitled to an allowance of 80 cents per ton, retroactively applied to war materials delivered and handled at that point since June 15, 1942.

The complaint asserts that the published rates and terminal tariffs provide for the absorption by the railroads of wharfage and handling charges on export and import freight handled through Norfolk, that allowances were made private operators at the specified piers prior to their acquisition by the Army to compensate them for handling commodities moved on such rates, and that the railroads have "refused to make the same allowance" to the War Department since it took over the piers. It says further that the wharfage charge specified in the tariffs is 20 cents per ton and the handling charge 60 cents per ton, making a total of 80 cents per ton allowed the Transport, Trading & Terminal Co., the operator of the piers under lease from the United States Maritime Commission until June 15, 1942, when they were taken over by the Army.

Failure of the railroads to make this allowance to the War Department is, according to the complaint, "unjust, unreasonable, and discriminatory, and unduly prejudicial

to military traffic." It further states that the procedure is not in full compliance with section 6(8) of the Interstate Commerce Act, which provides that in time of war the carrier should give "preference and precedence to and should facilitate and expedite the military traffic."

The Department of Justice contends that the operations of the Army in handling freight delivered to it by the railroads at these piers are substantially the same as those performed by the private operators to whom it says the allowances were conceded. On this basis it calls upon the commission to require the railroads to cease this alleged violation of the law, to make reparations to the government in the amounts specified in the tariffs for expenses incurred in handling and wharfage of freight, and to pay the federal government such an allowance or, alternatively, to establish a lower rate on such traffic.

Otto Beyer to Leave O. D. T.

The resignation of Otto S. Beyer as director of the Division of Transport Personnel of the Office of Defense Transportation, effective May 15, has been announced by O. D. T. Director Johnson. Mr. Beyer had held this post since it was established early in 1942 at the time the basic O. D. T. organization was completed, after having served on the national mediation board for six years, and he had been associated with the late Director Eastman when the latter was Federal Coordinator of Transportation.

"Mr. Beyer's position, that of handling the complex manpower problems of the transportation industries throughout the country, has been a difficult one," said Colonel Johnson. "These problems have not been eliminated and will continue throughout the war, but the procedures for handling them have been established and stabilized." Mr. Beyer, commenting upon his resignation, said that "this seems to be the logical time to make a change." His plans for the future were not disclosed beyond the explanation that he has been wanting to engage in other activities, and to complete some tasks left unfinished when he joined the O. D. T. Staff.

O. D. T. Again Restricts Summer Campers' Travel

Travel to and from children's summer camps will continue to be restricted during the 1944 season, the Office of Defense Transportation has announced. Reemphasizing the necessity of saving all passenger space for military and essential civilian traffic, the O. D. T. said that no Pullman space would be available for summer camp travel, and that extra day coach service could be obtained only through special permit. No charter or special bus service will be permitted unless written application has been made to and approved by the Office of Community War Services.

In 1943, only 25 permits for day coach space were issued by the O. D. T. for summer camp travel. The Office of Community War Services last year rejected well over 600 formal applications for bus service as unqualified for special permits.

Parents enrolling children in full-time summer camps were asked by the O. D. T. to choose a camp near home and to forego

Proposed 6 Months' Extension of Rate Reduction

The probability that the Interstate Commerce Commission will continue the existing suspension of the Ex Parte No. 148 rate increases for another six months beyond July 1, the date at which the suspension now in effect would terminate, was emphasized by the commission's order of April 17 directing the railroads to "show cause" why an extension of the suspension period to January 1, 1945, should not be made.

The provisions of the "show cause" order were similar to those of such an order served on the railroads in October, 1943, subsequent to which the commission ordered that the suspension of the rate increases be extended six months to end July 1. The current order requires parties to the Ex Parte No. 148 proceedings to file a return to the order with the commission before May 8, after which it will issue "such order in the premises as it may determine to be appropriate and requisite."

As reported in *Railway Age* of April 17, 1943, page 783, the suspension applied to the freight rate increases authorized by the commission, after extensive hearings, in the spring of 1942, which were estimated to amount to an average increase of about 4.75 per cent. The increase in regular passenger fares was not suspended, and the current "show cause" order has no effect on such fares, which continue on the basis established February 10, 1942, except that commutation fares in general have been restored to the level effective before that date, subject to further investigation by the commission.

week-end bus and train trips to visit children except in cases of absolute necessity, and camp authorities were urged to arrange any special travel schedules with railroads well ahead of time to avoid conflict with essential traffic movement.

W. P. B. Eases Restrictions on Small Construction Jobs

Restrictions on the construction of certain railroad operating facilities, such as tunnels, overpasses, underpasses and bridges not exceeding \$2,500 in cost of materials used, were lifted April 19 by the War Production Board.

This action, covered in Preference Rating Order P-142, as amended, relieves railroads from certain provisions of Conservation Order L-41. They may acquire the exempted amount of materials either by placing new Maintenance, Repair and Operating Supplies orders under P-142 or they may withdraw this quantity of materials from priority-obtained inventories. With respect to any project costing over the above limits, after the operator gets specific authorization in writing from the W. P. B. he may withdraw amounts over those limits from his inventory of materials acquired with priorities assistance.

GENERAL NEWS

Government Traffic Booms Air Express

Survey indicates decline when charges are no longer paid from public purse

From the facts developed in a survey of airborne transportation, covering some 800 representative shippers throughout the country, it is logical to conclude that airlines will probably find it difficult to maintain express traffic at the present volume after the government ceases paying shipping charges on a large portion of it, according to Brig. Gen. Leonard P. Ayres, vice-president of the Cleveland Trust Company. The results from the "sampling," together with tentative conclusions formulated from the findings, are set forth by General Ayres, economic advisor to the presidents of the Chesapeake & Ohio Lines in the May issue of *Tracks*, the railroads' employee magazine.

40 Per Cent Not Interested—General Ayres relates that the 800 shippers personally interviewed by traffic representatives of the C. & O. lines, do business in all of the 48 states and in many foreign countries. Fifty-four per cent of them were interested in air transportation. Forty per cent were not planning any use of the air for shipments, and six per cent expressed no views on the subject.

Thirteen per cent of the 800 are interested in international shipments by airplanes, and seven per cent plan to make air shipments regularly, and not merely in cases of emergency. Those using air facilities expressed satisfaction over the quality of service, including that of the Railway Express Agency, in connection with its shipments by air. The reasons ascribed for their use of the air facilities were three: The need for speed, existence of emergencies, and the fact that shipments were war goods, with the government paying the shipping costs.

Not a Service of Distribution—"Shipping of freight by air is not primarily a service of distribution," General Ayres writes. "It is rather an adjunct to production. More than half of all the shipments made by the shippers consisted of parts or components of machinery. Most air shipments consist of small parts that are necessary to make large and expensive machines operate."

"On the average," General Ayres continues, "the shippers using the air were sending 5.9 shipments per week, but half of them made not over one shipment per week. A few made so many shipments that the average was lifted far above the median, or typical, half-way number. A similar condition existed with respect to the weight of

New Stamp Marks 75th Year of Atlantic-Pacific Rails

The Post Office Department has announced its intention to place on sale on May 10 a 3-cent postage stamp commemorating the 75th anniversary of the completion of the first transcontinental railroad, which was marked by the driving of the golden spike at Promontory, Utah, on that day in 1869. The stamp also will be a tribute to the important contribution of the railroads to the current war effort, the announcement indicated. It will be placed on sale first in the cities which were the terminals of the Union Pacific and Central Pacific lines that formed the original transcontinental railroad.

the shipments. The average was 81 lb., but half of the shipments weighed 15 lb. or less. Some of them weighed as much as 1000 lb.

Averages Deceptive—"Annual payments of shipping charges showed an average of \$2,156, but that amount is deceptive because a few large shippers made exceptionally heavy payments. The largest annual rate of payment reported was \$65,000. Half of the annual payments of shipping charges amounted to \$250 or less. It would be mathematically correct to report that the average shipper by air sends 5.9 shipments of 81 lb. each per week, and that his annual shipping charges amount to \$2,156."

Among the tentative conclusions which General Ayres says may be drawn from the findings are these: That the majority of the shippers will use air freight or air express service after the war; that present service is highly satisfactory except for the expense; that cost is uppermost in the minds of shippers and all will seek the cheapest means of transportation in the post-war period; that there is a limited but vocal interest in international shipping and that the prime reason for shipment by air appears to be the speeding up of the production of goods rather than the distribution of finished products.

Truckers to Hear Johnson

At a meeting in Cincinnati, Ohio, May 9, of the safety and operations section of the American Trucking Associations, Colonel J. Monroe Johnson will make what that organization expects to be his first public address since his appointment as director of the Office of Defense Transportation, according to a recent announcement. He will speak at the luncheon meeting on that date. The director of the O. D. T. Division of Motor Transport, Harold C. Arnot, also is scheduled to address this group during its two-day session.

Soliciting Proxies for C. & E. I. Meeting

Boatner seeking support of stockholders for his slate of directors

Victor V. Boatner, a director of the Chicago & Eastern Illinois, on April 13, sent stockholders of that road a request for proxies to be used in the election of directors at the annual meeting in Chicago on May 12.

Mr. Boatner seeks to elect as directors John B. DeHaven, president of Allied Mills, Inc.; Arthur G. Heidrich, president of the Peoria Cordage Company; Alfred Mac Arthur, president of the Central Life Insurance Company; Henry E. Perry, executive vice-president of the Commercial Solvents Corporation; J. Travis Flieschel, president of the Flieschel Lumber Company; and Robert F. Carr, chairman of the board of the Dearborn Chemical Company. These members plus Mr. Boatner would increase his representation to seven, or a majority of the board. Of the seven, Messrs. Perry, Flieschel, Carr and Boatner are now members of the board while Mr. MacArthur has also been proposed by the management.

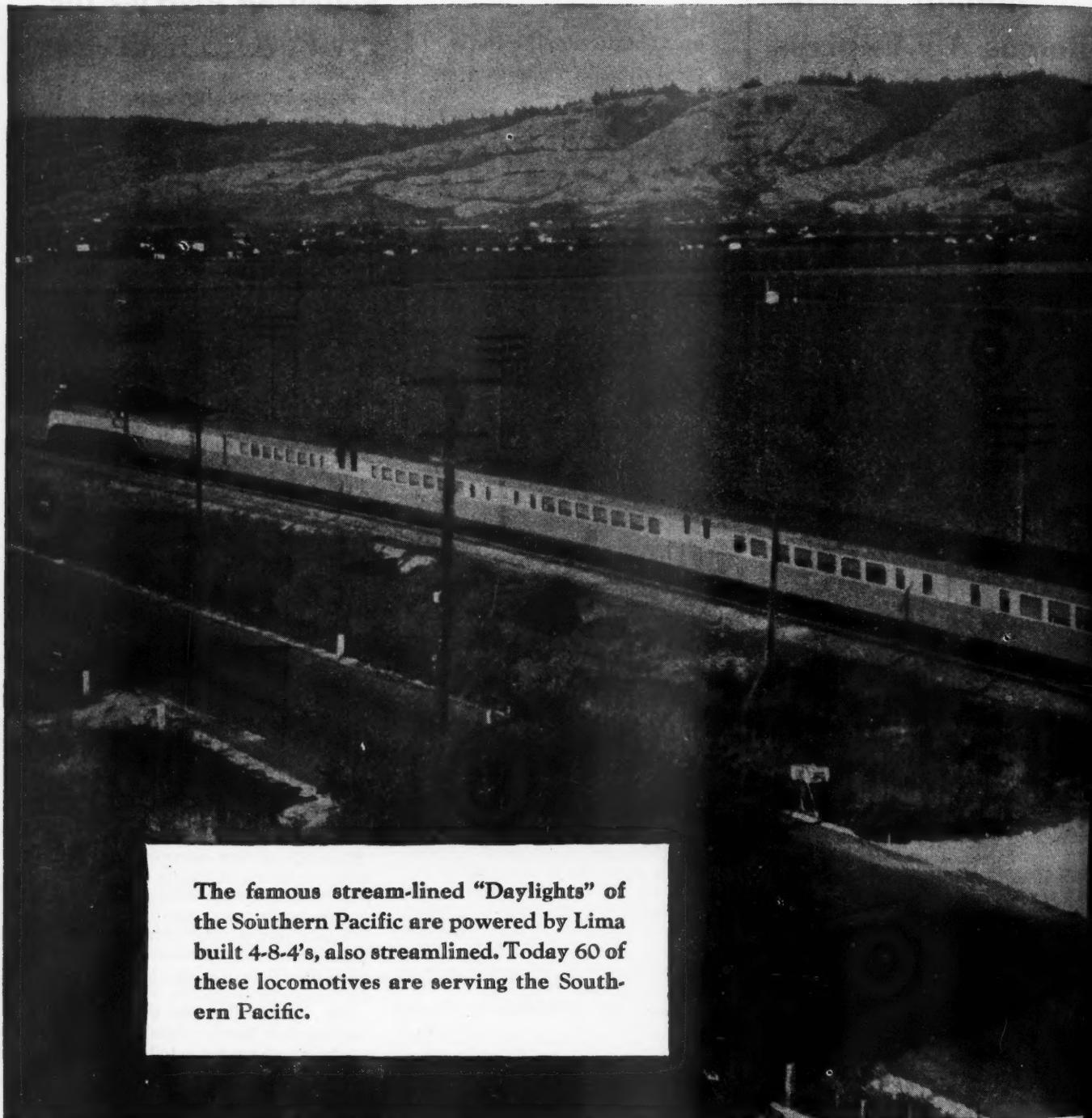
Says Refunding Has Been Blocked—In his letter to stockholders, Mr. Boatner declared that the majority of directors, including three members representing the R. F. C., had blocked consummation of a debt refunding program and payment of larger dividends. Mr. Boatner said that his plan, if carried out, would save the company \$1,400,000 in interest and effect a \$4,661,000 reduction of debt over a four year period. "Under this proposal," he said, "\$1,661,000 of first mortgage bonds would be presently retired, and the balance, \$8,500,000, refunded by the issuance of new obligations, part to mature at the rate of \$250,000 each year through 1955 at an average interest rate of 3½ per cent and the balance of \$5,500,000 to bear 3¾ per cent interest and mature on December 31, 1955."

Mr. Boatner also said that the director majority last March refused to approve his resolution asking for a full \$2 dividend on the class A stock and \$1 on common. He stated that last year the class A dividend was earned more than 2½ times and that since the road's cash position is strong, "a dividend on the common stock is fully justified."

Finds Costs Out of Line—"Cost of operating the C. & E. I. can be reduced and its operating efficiency improved," he said. "Transportation costs, in proportion to revenues, are higher than those of other railroads."

In a letter sent to stockholders on May (Continued on page 794)

STREAM-LINED



The famous stream-lined "Daylights" of the Southern Pacific are powered by Lima built 4-8-4's, also streamlined. Today 60 of these locomotives are serving the Southern Pacific.



LIMA LOCOMOTIVE

STEAM POWER

for

TOMORROW'S PASSENGER TRAINS



"Stream-liners" are what the public wants. They have proved this by their dollars.

In the days to come passenger traffic can only be held by modern luxury equipment operated at convenient and frequent intervals.

Lima-built power, modern in design and appearance is a fitting accompaniment to the bright, colorful and comfortable stream-liner that will be tomorrow's standard of passenger transportation.

WORKS, INCORPORATED
LIMA, OHIO

Joseph B. Ennis the Henderson Medalist

Franklin Institute honors him for notable achievements in locomotive development

Joseph B. Ennis, senior vice-president of the American Locomotive Company, received the George R. Henderson Medal from the Franklin Institute, Philadelphia, on April 19. This medal is awarded for meritorious inventions or discoveries in the field of railway engineering. The citation for Mr. Ennis reads: "In consideration of his accomplishments in locomotive engineering and important contributions in the field of locomotive design."

Career in Locomotive Field—Mr. Ennis' entire business career, extending over almost a half century—49 years to be exact—has been in the field of locomotive engineering and design. Starting as a tracer, detail draftsman and elevation draftsman with the Rogers Locomotive Works in 1895, he went to the Schenectady Locomotive Works in 1899. About a year later he returned to the Rogers Locomotive Works as an elevation draftsman, but in 1901 took a similar position with the Cooke Works of the American Locomotive Company. In 1902 he was transferred to the New York office of the American Locomotive Company and was placed in charge of designs and calculation-specifications for locomotives. In 1906 he was appointed assistant to the mechanical engineer; in 1908 designing engineer; in 1912 chief mechanical engineer; in 1917 vice-president in charge of engineering; in 1924 he was made a director; and on January 1, 1941, senior vice-president.

For more than three decades he has been an outstanding factor in shaping the development of modern locomotives. It is not strange, having worked under F. J. Cole in the early part of the century, that he became an authority on locomotive proportions and balanced design. An engineer for a railroad equipment company, in collaborating with railroad mechanical department officers, as a matter of diplomacy, remains more or less in the background from a publicity standpoint. Many of these officers, however, have been enthusiastic in expressing appreciation for the assistance and inspiration that they have received from Mr. Ennis.

In Forefront of Locomotive Progress—While other names were prominently identified with the early development of the Mallet locomotive in this country, it is no secret that Mr. Ennis, remaining modestly in the background, was a vital factor in co-ordinating their ideas and suggestions into workable designs. There have been instances, however, when he was in a position to dramatize the products of his company and exercise forward-looking leadership in developing locomotive design to meet new and changing conditions. This is exemplified in the American Locomotive Company experimental No. 50,000, a Pacific type locomotive, which was the forerunner of the modern steam locomotive producing high

horsepower output per given total weight of locomotive. Likewise, the Timken roller bearing locomotive built by his company, used experimentally on several railroads and finally purchased by the Northern Pacific, was designed under Mr. Ennis' supervision and direction. The same thing is true of the 4-4-2 high speed, streamline passenger steam locomotive, built for the original Hiawatha train of the Chicago, Milwaukee, St. Paul & Pacific.

Mr. Ennis has sponsored and largely directed the design of the Diesel-electric locomotive built by the American Locomotive Company, which dates back to the switching locomotives introduced by that company in



Joseph B. Ennis

1924. He has made a practice of following closely the foreign development of steam locomotives and Diesel engines used in railroad service and has made a number of trips to Europe to obtain first-hand information.

Speakers Selected for Annual Meeting Freight Claim Division

The tentative program of the annual session of the Freight Claim division, which was published in the *Railway Age* of April 1, has been completed with the selection of key speakers. Among those who will address the meeting at Cincinnati, Ohio, on April 25-27 are Brig. Gen. Robert H. Wylie, assistant chief of transportation of the United States Army, Washington; and John J. Brinkworth, vice-president and general manager of the New York Central at Cincinnati. Two radio programs will be presented over Cincinnati stations on April 25 and 26, with General Wylie and Mr. Brinkworth as the speakers.

Northwest Board Meeting

The sixty-ninth regular meeting of the Northwest Shippers Advisory Board will be held at Aberdeen, S. D., on April 27. At a luncheon session, F. S. Keiser, associate director of the ore and grain movement section of the Office of Defense Transportation, will address the meeting on the Crop Situation and Car Supplies for 1944.

Fiscal 1943 Report of Pension Board

Tells how war with high level of employment has affected all activities

The war and the attendant large industrial production and high level of employment affected every activity of the Railroad Retirement Board in 1942-43, according to the recently issued annual report of the Board for the fiscal year ending June 30, 1943. The tremendous increase in the volume of railroad traffic and the decrease in manpower available for railroad employment, the report states, changed the emphasis of the Board's activities from paying retirement and unemployment insurance benefits to supplying personnel and stabilizing employment in the industry.

Rising pay rolls and declining rates of retirement and unemployment increased both the retirement and unemployment insurance accounts. Less directly as a result of war conditions, but in part because of them, the report points out, numerous suggestions for extension of the scope of the railroad social insurance system and for increase in benefits were proposed by various sources.

Employment Averages High—"The increased traffic load raised the estimated average employment in the railroad industry from 1,490,000 in mid-June, 1942, to 1,610,000 in mid-June, 1943," the report continues. "Average employment for the year, however, increased more sharply, due to the absence of a large part of the usual fall and winter layoffs. The difficulties in obtaining workers to cope with the heavier burden and to replace those leaving for military service and other industries kept the total number of employees below actual requirements. In its efforts to ease the growing manpower shortages, the board greatly expanded its employment service during the year.

"With labor shortages mounting, the number of workers unemployed and eligible for benefits naturally declined. Only 15,400 individuals received benefits for unemployment experienced during the year, compared with 74,200 in 1941-42. The average number of payments per unemployed worker also declined. The total amount of benefits paid in 1942-43 was \$1,753,000, compared with \$8,890,000 in the preceding year.

Fewer Retirement Applications—"The need for maintaining an experienced working force and greater opportunities for full-time employment accounted for the reduction in the number of applications for retirement annuities received by the board and the consequent drop in the number of annuities certified. In each case, there was a slight decline from the 1941-42 figure which was the lowest up to that time since the passage of the 1937 act. Toward the end of the year, however, receipts of annuity applications began to rise somewhat. Because new certifications of monthly retirement and survivor benefits fell off very little and exceeded terminations during the year, the amount of benefits paid continued to rise. Lump-sum death benefits also rose

FUEL

a strategic material

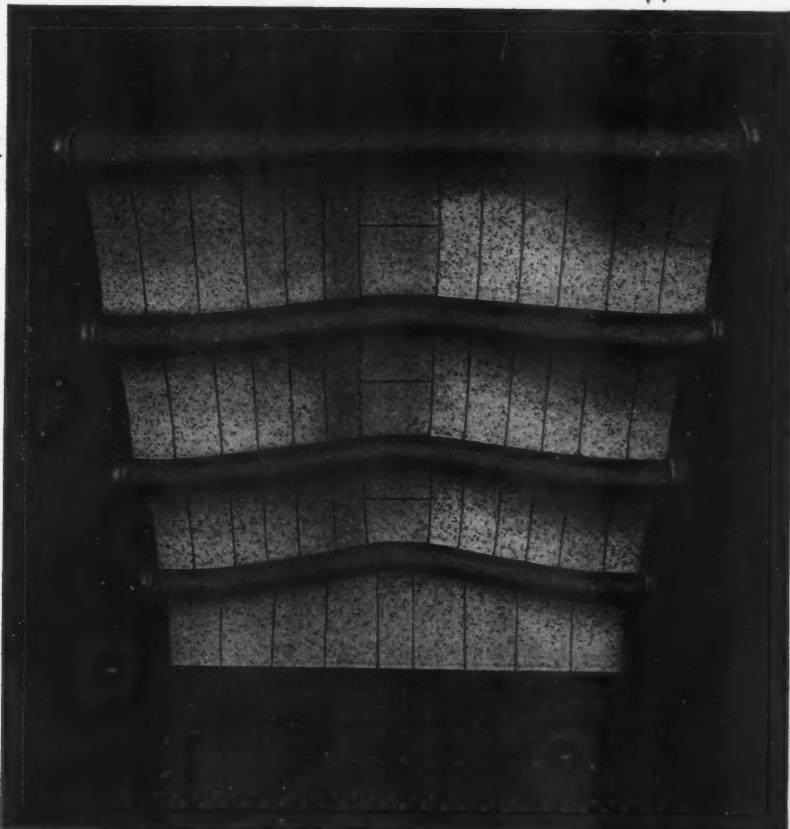
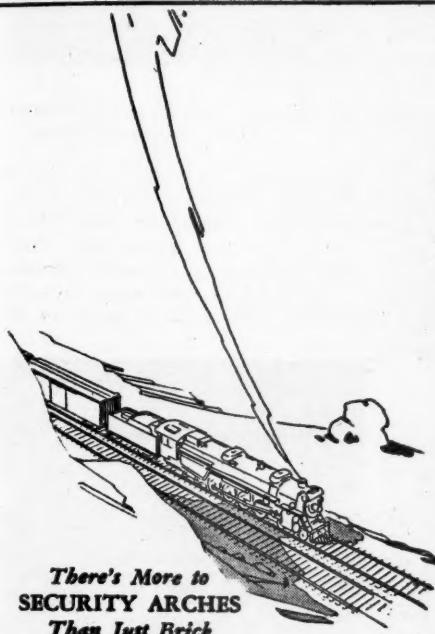
CONSERVED

with Security Sectional Arches

Today, more than ever, fuel is one of our strategic materials. Making every pound of fuel produce the maximum amount of steam not only conserves this strategic material but also the cars required to transport it.

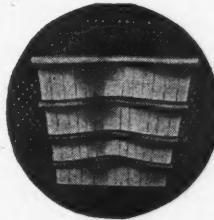
For over 33 years, Security Sectional Arches have been saving fuel on all types of steam locomotives.

But experience has proved that only with a *complete* Arch can maximum fuel economy be realized.



**HARBISON-WALKER
REFRACTORIES CO.**

Refractory Specialists



**AMERICAN ARCH CO.
INCORPORATED**
60 EAST 42nd STREET, NEW YORK, N. Y.
**Locomotive Combustion
Specialists**

Combined payments increased from \$126,657,000 in 1941-42, to \$130,864,000 in 1942-43.

"While benefit operations declined, the board's wage record work expanded considerably because of increased employment in the industry. During the calendar year 1942, 820,000 new employees received wage credits under the acts for the first time since the board began collecting wage and service records in 1937, compared with 525,000 in the preceding year. By December 31, 1942, more than 4,000,000 individuals had established credits under the acts.

Pension Taxes Up 23 Per Cent—"The receipts during the fiscal year 1943 reached a total of \$208,795,000, a rise of 23 per cent over the receipts for the preceding year, and 52 per cent over those for 1940-41. . . . Taxable pay rolls amounted to \$2,400,000,000 in 1940-41, \$3,000,000,000 in 1941-42, and \$3,500,000,000 in 1942-43; total earnings in the industry were somewhat larger, since compensation in excess of \$300 for any month is not taxable. . . . The increased tax rate went into effect on January 1, 1943, when the combined tax on employees and employers rose from 6 to 6½ per cent.

"The railroad retirement account began the fiscal year with a balance of \$94,140,000. The Congressional appropriation for the year amounted to \$214,801,000. Interest on investments provided an additional \$5,777,000, making a total of \$220,578,000 available during the year for benefit payments and further investments. Benefit payments accounted for \$130,864,000, leaving a balance at the end of the year of \$178,000,000 in 3 per cent Treasury notes and \$5,854,000 in cash.

The Retirement Fund—"From the beginning of operations through June 30, 1943, the Treasury made available to the retirement system a total of \$882,233,000, consisting of \$854,151,000 for benefit payments and investments, \$9,000,000 for payments to employers under the prior service program, and \$19,082,000 for administrative expenses. Taxes actually collected through that date were \$896,449,000, or 1.6 per cent in excess of this total. Moreover, taxes amounting to \$62,321,000 had accrued, chiefly on April-June, 1943, payrolls, but did not become payable until the July-September quarter. There should also be added \$6,363,000 due the account, representing the Government's contribution to date to cover the cost through June, 1942, of the military service amendments. Somewhat offsetting these additions is an estimated \$5,000,000, representing the excess of the total amount obligated through June, 1943, over the amount actually certified in benefit payments. If these factors are considered, the balance in the retirement account as of June 30, 1943, would be \$261,000,000, compared with \$161,000,000 as of June 30, 1942, computed on the same basis.

"The appropriation for the administration of the retirement system for 1942-43 was \$3,041,000. Expenditures total \$2,857,000, including costs incurred under the prior-service program other than the payments to employers for verification of service and compensation claimed by employees. Payments to employers amounted to \$2,329,000 during 1942-43. The balance as of June 30, 1943, of the \$9,000,000 appropriated for that purpose in October, 1940, was \$271,000.

The Congressional resolution establishing the program provided that no payments may be made after this date.

Unemployment Taxes Up 21 Per Cent—"The same conditions in the railroad industry which caused the substantial rise in tax collections under the retirement program brought about a 21 per cent increase in contributions under the Railroad Unemployment Insurance Act. During 1942-43, the board collected \$102,670,000 from employers covered by that act, compared with \$84,606,000 in the preceding year. The contribution rate for employers under the unemployment insurance act is 3 per cent of taxable compensation.

"The act provides that 90 per cent of the contributions collected be credited to the unemployment insurance account for benefit payments. In the fiscal year 1943, the amount so allocated was \$92,406,000. The act also provides that any amount in excess of \$6,000,000 in the administration fund at the close of a fiscal year be transferred to the benefit account. In July, 1942, \$5,973,000 was transferred under this provision. An additional \$6,857,000 was earned in interest, thus raising total receipts for the year to \$105,236,000. This amount, added to the balance of \$266,366,000 on July 1, 1942, less disbursements of \$1,753,000, left \$369,846,000 in the account on June 30, 1943.

\$1.1 Million for Employment Service—"Ten per cent of the contributions collected from employers is set aside for administrative purposes each year, as provided by law. In 1942-43, this amount was \$10,265,000. The fund also received a final transfer of \$3,597,000 from the United States Treasury under section 11 (b) of the Railroad Unemployment Insurance Act. Expenses for the year were \$2,184,000, leaving a balance on June 30 of \$17,700,000. About \$11,700,000 was transferred to the unemployment insurance benefit account after the close of the fiscal year.

"In 1942-43, for the first time, the expenditures for employment service and unemployment insurance operations were separated. For the latter, \$1,010,000 was spent, while employment service expenses amounted to \$1,092,000. The remaining \$82,000 was divided almost equally among expenditures for the injury and disease study, purchase of advance supplies, and certain overhead services."

Equipment on Order

Class I railroads on April 1 had 36,727 new freight cars on order, according to the Association of American Railroads. On the same date last year, they had 20,712 on order.

This year's April 1 total included 15,815 hopper, 4,230 gondolas, 800 flat, 11,386 plain box cars, 3,150 automobile box cars, 1,146 refrigerator, and 200 stock freight cars.

The Class I roads also had 755 locomotives on order on April 1, compared with 586 on the same day in 1943. The former figure included 243 steam, two electric and 510 Diesel-electric locomotives, contrasted with 392 steam, 12 electric and 182 Diesel-electric locomotives one year ago.

Class I roads put 7,838 new freight cars in service in the first three months this year compared with 4,657 in the same period last year. Those installed in this year's first

three months included 4,494 hopper, 524 gondola, 715 flat, 358 automobile box, 1,693 plain box, and 54 refrigerator freight cars.

They also put 261 locomotives in service in the first quarter of 1944, of which 112 were steam, one electric and 148 Diesel-electric. Locomotives installed in the first three months of 1943 totaled 159, of which 125 were steam, 6 electric and 28 Diesel-electric.

L. & N. Train Announcements by Transcription

The Louisville & Nashville is using phonograph records for train announcing at Union Station, Louisville, Ky. The system was adopted to assure that the announcing be done with the right tone of voice and in the exact language considered most appropriate. Under normal conditions of opera-



A Train Announcement Is Placed on the Public Address System

tions, without the records, it was necessary that the announcing be done by a number of different employees, not all of whom could have the special gift required for talking clearly over a public address system.

The records are made by Harry N. Clarke, of the L. & N. magazine staff, who

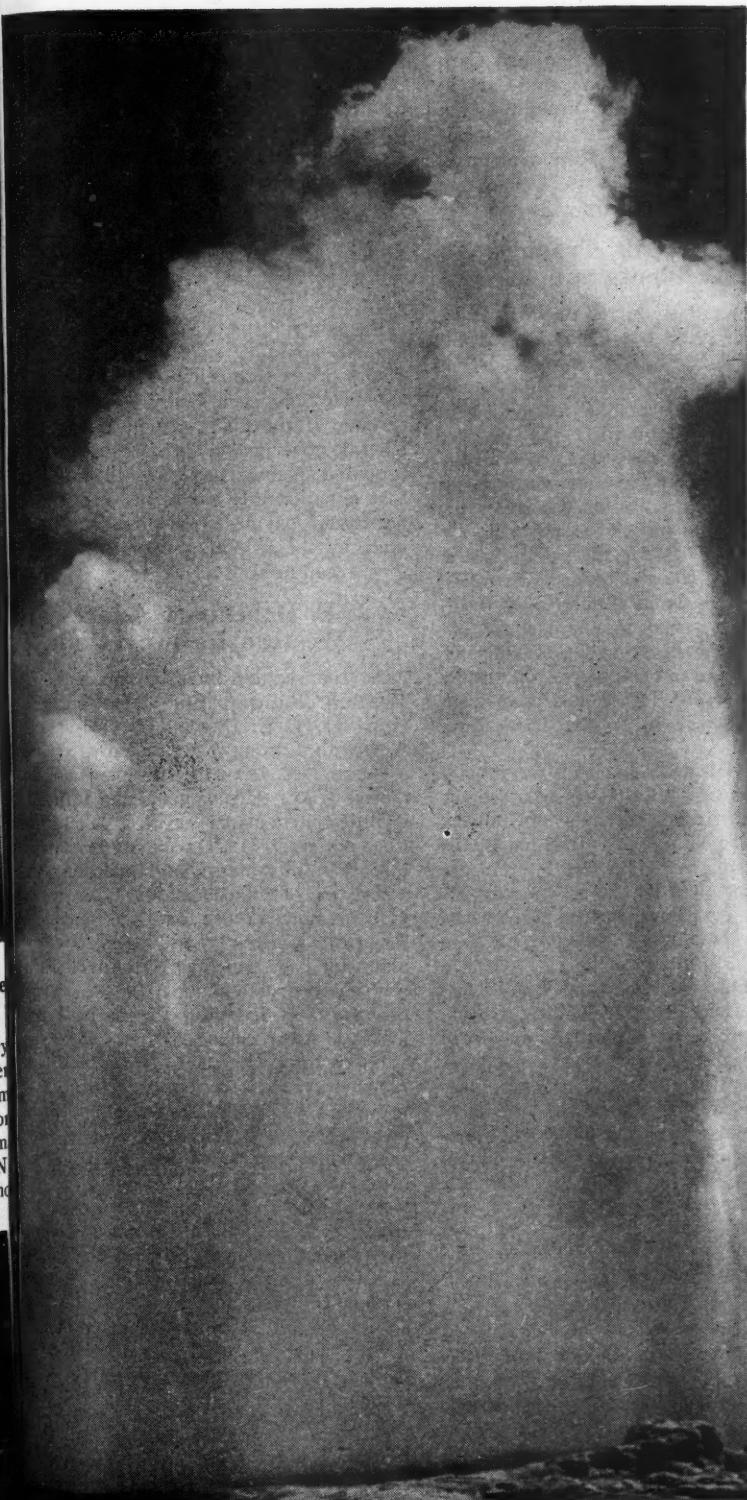


H. N. Clarke and H. W. Burwell Make Train Announcement Recording

does the announcing into the recording machine from carefully prepared scripts, and H. W. Burwell, telephone engineer, who

SUPERHEAT
AMERICAN
EXHAUST

Running, Drifting or Standing



High Temperature
Water is delivered
to the boiler
at all times
... by the
**Elesco EXHAUST
STEAM INJECTOR.**
It is dependable.

Photograph shows Old Faithful Geyser

A-1264
HARVEST ROBERTS

SUPERHEATERS • FEEDWATER HEATERS
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EXHAUST STEAM INJECTORS • PYROMETERS

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60 East 42nd Street, NEW YORK
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Montreal, Canada
THE SUPERHEATER COMPANY, LTD.

attends to the mechanical details of the job.

The railroad has public address systems at a number of points on the railroad, but the only one at which the phonograph system has been adopted is Louisville.

Argument Set in Southern Grain Rate Proceedings

The Interstate Commerce Commission will hear oral argument beginning July 12 in the southern grain rate adjustment proceedings, according to an announcement April 17. The argument will deal with the "system of one-factor interterritorial rates on common levels" outlined in a proposed report in the No. 17000 proceeding, part 7-A, prepared by Examiner Frank M. Weaver and issued by Commissioner J. Monroe Johnson for the consideration of interested parties, as reported in *Railway Age* of September 4, 1943, page 392. The arguments before the full commission at Washington, D. C., will embrace also the issues raised in a number of related cases, including I. & S. No. 4208, all having to do with grain rates to, from and within Southern Territory.

Trainmen Aid Ward Strikers

A. F. Whitney, president of the Brotherhood of Railroad Trainmen, on April 15, instructed his union to refuse to handle any "new business" for Montgomery Ward & Co. and thus support the strike of the C. I. O. against the company at its two main properties and warehouses at Chicago. Previously the teamsters unions, affiliated with the A. F. of L., and the Illinois Union of Telephone Workers, refused to cross the picket lines. The strike broke out on April 12 after the company refused to comply with a War Labor Board directive ordering the management to extend an expired contract with the United Retail, Wholesale and Department Store Employees of America, Local 20, (C. I. O.).

Another Superhighway Bill

Representative Wene, Democrat of New Jersey, on April 18 introduced in the House H.R. 4628, a bill to provide for the post-war construction of the proposed 33,920-mile federal interregional highway system and its adjuncts and to authorize an annual appropriation of \$670,000,000 for three successive post-war years to be apportioned among the states for this purpose, such federal funds to be matched by the states. Elimination of hazards at railway-highway crossings is included among the types of construction to which this bill's provisions would apply.

Perfect Shipping Month Dinner to Be Held at Cincinnati

A perfect shipping dinner-meeting, sponsored by the Ohio Valley Transportation Advisory Board, the chamber of commerce, the board of trade, the traffic club, the superintendent's committee, the freight agent's association, and all railroads of Cincinnati, the O. D. T.-I. C. C. Advisory committee, the Railway Express Agency and the Car Service and Freight Claim divisions of the Association of American Railroads, will be held at Cincinnati, Ohio, on April 25.

The speakers, each representative of transportation interests, include: Brig. Gen. Robert H. Wylie, assistant chief of transportation of the United States Army, Washington; E. B. De Vilbiss, manager of the Insurance department of the Pennsylvania, Philadelphia, Pa.; R. H. Hagerman, traffic manager of the National Cash Register Co., Dayton, Ohio; and Carl F. Jackson, secretary of the Freight Claim section, of American Trucking Associations, Inc., Washington. Motion pictures, "War Time Packaging" and "Damage to Sewer Pipe," will be shown.

Milwaukee Awards Trophies To Reduce Accidents and Fires

In an effort to stimulate the prevention of accidents and fires, the Chicago, Milwaukee, St. Paul & Pacific has awarded burgees and trophy cups to the two divisions making the best records among the road's 18 divisions in 1943. On April 12, the Dubuque and Illinois division was presented with the safety pennant and trophy cup and on April 18, the Terre Haute division was given the fire prevention pennant and trophy cup.

At the ceremonies for the safety award, held at Savanna, Ill., the burgee was raised by color bearers from the Savanna Ordnance Depot, assisted by the Depot's 35-piece band. At a dinner in the evening, attended by officers and employees, the trophy cup was presented by H. A. Scandrett, trustee of the railroad, to the division superintendent.

The fire prevention luncheon ceremonies at Terre Haute, Ind., were attended by Henry F. Schricker, governor of Indiana, all of the members of the Indiana Public Service Commission, Glen Smith, state fire marshal, other civic officers and nearly 400 railroad workers. An engraved trophy cup, awarded the employees, was presented to the division superintendent by J. T. Gillick, chief operating officer of the railroad. Addresses were made by Mr. Gillick, Governor Schricker, Vern McMillan, mayor of Terre Haute and L. J. Benson, assistant to the chief operating officer in charge of the Milwaukee Road's fire prevention division. In the forenoon a fire prevention award pennant was raised with color bearers from the local posts of the American Legion assisting in the ceremony.

Ickes Still Opposes Repeal of Land-Grant Rates

Replying to an invitation to express his views on H.R. 4184, the bill introduced by Representative Boren, Democrat of Oklahoma, to effect the repeal of the remaining provisions of the land-grant rate statutes, Secretary of the Interior Ickes has written to Chairman Lea of the House committee on interstate and foreign commerce to express his opposition to the measure. Hearings on the bill were completed by a subcommittee under Mr. Boren's chairmanship on March 23, and the subcommittee on the following day voted to report the bill, with certain modifications, favorably to the full committee.

In stating his position on the bill, Mr. Ickes wrote in part as follows:

"I recommend that the bill be not enacted. It is merely a gift of large sums of money from the federal treasury to the

benefiting railroads for which there is no compensation or return to the United States. This department under date of December 2, 1942, made a statement to your committee in connection with a similar bill."

Continuing, the Secretary added the suggestion that, if the land-grant repeal bill should be enacted, it should first be amended "so that the relief provisions will not apply to any land-grant railroad unless or until such railroad or landholding subsidiary has reconveyed to the United States all patented lands except those sold to third persons for value and those directly used in the operation of the railroad." "If the United States surrenders a valuable right to the railroads, it should receive a proper consideration," he said.

Recognizing the probability that this suggestion would be opposed on the ground that local governments now enjoying tax revenue from such lands would lose that revenue if the lands should revert to the federal government, Mr. Ickes offered a proposed amendment to the bill to alleviate that situation. It would provide for compensatory payments to the local taxing units by the federal government for lands thus recaptured.

J. E. Davenport Addresses Western Railway Club

At the regular monthly meeting of the Western Railway Club at Chicago on April 17, J. E. Davenport, vice-president, American Locomotive Company, presented a comprehensive picture of present railway motive power developments and future possibilities, in a paper entitled "Tomorrow's Locomotives." Mr. Davenport reviewed the respective advantages and operating characteristics of all the major types of locomotives now in use or contemplated for American railroads and emphasized the dominant part which effective modern motive power can and must play in winning the war and handling the nation's traffic in the postwar period.

Following Mr. Davenport's paper, prepared discussions of the same subject were presented by A. J. Townsend, chief mechanical engineer, Lima Locomotive Works, Inc., who emphasized the great improvements already effected in modern steam locomotives, and by R. P. Johnson, chief engineer, The Baldwin Locomotive Works, who pointed out that two of the advantages of Diesel motive power, namely standardization and availability, are applicable to an increased extent to steam locomotives if the railroads really care to work on them. More extensive abstracts of the three papers will appear in a subsequent issue of *Railway Age*.

Franklin Institute Awards

The Franklin Institute at its Annual Medal Day in Philadelphia on Wednesday April 19, presented a number of medals and awards. One of these, the Henderson Medal, for meritorious inventions or discoveries in the field of railway engineering, was presented to Senior Vice-President Joseph B. Ennis of the American Locomotive Company, as noted elsewhere in this issue.

Other awards that may have more than a passing interest for railroaders, include

the presentation of the Levy Medal to Stephen P. Timoshenko of the Department of Theoretical and Applied Mechanics of Stanford University, for his paper on "The Theory of Suspension Bridges," published in the Journal of the Franklin Institute. Willem Fredrik Westendorf of the General Electric Research Laboratory at Schenectady, was awarded the John Price Wetherill Medal because of his X-ray discoveries, which have made possible the radiographic inspection apparatus used to detect defects in steel castings. Dr. Harvey Clayton Rentschler, director of research, Lamp Division, Westinghouse Electric & Manufacturing Company, was awarded the Frank P. Brown Medal "in consideration of his application of a source of bactericidal ultraviolet radiation in air conditioning systems in a scientific and practical manner." The Western Union Telegraph Company, represented by its president, A. N. Williams, was awarded a certificate of merit "for the development of the reperforator switching system, a contribution to the greater accuracy and speed of telegraphic service."

March Ton-Miles Exceeded 1943 Figure by 2.1 Per Cent

The volume of freight traffic, measured in ton-miles of revenue freight, handled by Class I railroads in March exceeded that of the same month last year by more than two per cent, according to the Association of American Railroads. It amounted to approximately 62,500,000,000 ton-miles, according to preliminary estimates. Class I roads in the first three months of 1944 performed approximately 7 per cent more revenue ton-miles of service than in the same period of 1943, 38 per cent more than in the same period of 1942, and 192 per cent more than in the first three months of 1939.

The following table summarizes ton-mile statistics for the first three months of 1944 and 1943:

	1944	1943	Per cent increase
January...	60,487,994,000	55,134,789,000	9.7
February...	159,400,000,000	54,419,933,000	9.2
March...	262,500,000,000	61,220,266,000	2.1
3 months' total...	182,387,994,000	170,774,988,000	6.8

¹ Revised estimate.

² Preliminary estimate.

Expect Puerto Rico to Supply 2,000 M. of W. Laborers

A recruiting campaign which is expected to result in adding two thousand unskilled men to the rolls of railway maintenance employees in the United States during the next two months has been undertaken in Puerto Rico, the War Manpower Commission disclosed April 14. The campaign will be conducted by the United States Employment Service, and railroad representatives will be assigned to the San Juan office of that service to select workers from those whose applications are received there, it was said.

The provisions of the contract under which it is proposed that these men will work include a guaranteed minimum of 1,000 hours of work during six months at a rate of 66 cents per hour, with overtime for work over 8 hours in one day or 40 hours in one week. The employer will advance the cost of transportation from Puerto

Rico to the place of employment, and will make deductions from the employee's pay to meet the cost of the water transportation from the island to the port of entry. Provided the employee meets the provisions of the contract, the employer will bear the cost of his return transportation at the expiration of the contract.

Union membership will not be "required" of these men, the W. M. C. pointed out, but they "may become members of the Brotherhood of Maintenance of Way Employees if they so desire."

Denver & Rio Grande Western Expands Safety Organization

The Denver & Rio Grande Western has expanded its safety organization by the appointment of an assistant to the superintendent of each division who will have jurisdiction over safety matters in all departments on the division. The newly appointed assistants to superintendents are: Pueblo division, G. C. Stromsoe, formerly chief clerk to the chief engineer; Alamosa division, T. J. Cummins, formerly road foreman and assistant superintendent; Grand Junction division, R. W. McCarty, chief clerk to the superintendent; and Salt Lake division, R. O. Barber, formerly assistant trainmaster.

Freight Car Loading

Loadings of revenue freight for the week ended April 15 totaled 799,965 cars, the Association of American Railroads announced on April 20. This was an increase of 10,641 cars, or 1.3 per cent, above the preceding week and an increase of 19,057 cars, or 2.4 per cent, above the corresponding week last year, but a decrease of 46,540 cars, or 5.5 per cent, below the comparable 1942 week.

Loading of revenue freight for the week ended April 8 totaled 789,324 cars, and the summary for that week, as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loading

For the Week Ended Saturday, April 8

District	1943	1942	1941
Eastern	154,320	160,803	168,381
Allegheny	177,220	177,033	180,176
Pocahontas	53,164	57,886	56,974
Southern	124,423	124,805	129,390
Northwestern ..	89,169	81,522	110,684
Central Western ..	118,933	115,136	109,867
Southwestern ..	72,095	71,834	58,624

Total Western Districts	280,197	268,492	279,175
Total All Roads	789,324	789,019	814,096

Commodities	1943	1942	1941
Grain and grain products	40,117	41,959	33,861
Live stock	14,182	13,765	11,117
Coal	168,647	173,831	160,611
Coke	14,953	14,673	13,755
Forest products	45,741	42,659	46,868
Ore	21,310	21,196	51,007
Merchandise l.c.l.	108,604	99,519	132,367
Miscellaneous	375,770	381,417	364,510
April 8	789,324	789,019	814,096
April 1	787,525	772,102	829,038
March 25	778,925	787,340	808,286
March 18	786,442	768,134	796,654
March 11	781,533	769,045	799,356

Cumulative total, 15 Weeks.... 11,667,973 11,222,102 11,799,336

IN CANADA.—Carloadings for the week ended April 8 which included the Easter holiday, totaled 63,008 as compared with 68,995 for the previous week and 66,383 cars for the same period last year, accord-

ing to the compilation of the Dominion Bureau of Statistics.

Total Cars Rec'd from Connections

Total for Canada:	Total Cars Loaded	Total Cars Rec'd from Connections
April 8, 1944.....	63,008	41,320
April 1, 1944.....	68,995	43,184
March 25, 1944.....	69,745	43,173
April 10, 1943.....	66,383	42,960

Cumulative Totals for Canada:

April 8, 1944.....	948,171	562,031
April 10, 1943.....	859,119	542,515
April 11, 1942.....	868,417	450,829

Soliciting Proxies for C. & E. I. Meeting

(Continued from page 790)

12, Charles T. O'Neal, president, advised stockholders that the annual meeting may involve a contest for control of the company. "V. V. Boatner," the letter stated, "who has been a director since 1942, has been conducting a press campaign against your management and has indicated that he will solicit proxies for nominees of his own choosing who, if elected, would control the board of directors.

"Mr. Boatner's allegation that the Reconstruction Finance Corporation, which owns \$10,161,000 of our first mortgage 4 per cent bonds, due in 1967, has interfered with the reduction of debt of the company is wholly false.

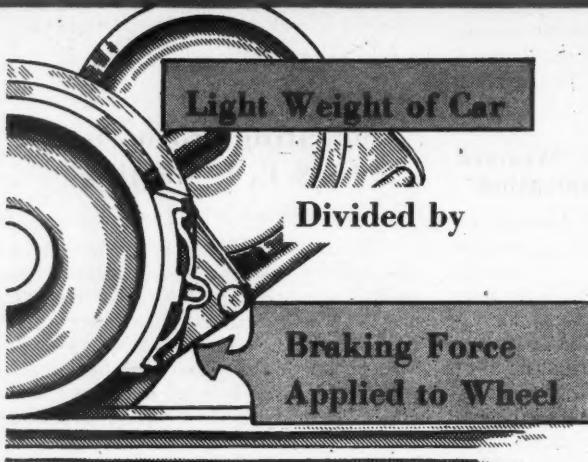
Management Disagrees—In January, 1944, Mr. Boatner submitted a proposal to refund these bonds. This proposal was rejected by the board because it would have meant an immediate expenditure of \$1,661,000 treasury cash which would have weakened the financial position of the company and necessitated a modification of dividend policy. It would also have substituted serial maturities of \$250,000 annually to 1955 when the remaining \$5,500,000 would become due 12 years before the maturity of the present bonds. The proposal would have replaced the present contingent sinking fund with a larger mandatory amortization which might have become burdensome. The same debt retirement as proposed in his plan over the next 12 years can be carried out under the optional provisions of the present first mortgage at a lower over-all cost to the company. The terms of the present first mortgage bonds are favorable to the company. However, if any opportunity arises to refund them on a more advantageous basis you may be sure that this will be done promptly.

"It is the opinion of your management that Mr. Boatner's activities in recent weeks have not reflected favorably on the company and that his real interest in making this contest is his personal desire to obtain a salaried position with the company."

On April 15, Mr. O'Neal requested Senator Edwin C. Johnson, chairman of the Sub-committee of the Senate Interstate Commerce committee to advance the date of the hearings which are scheduled for April 27 to determine whether an inquiry is necessary into the relationship existing between the Reconstruction Finance Corporation and the management of the C. & E. I. "It is vital to this company that your investigation be made as expeditiously as possible," the telegram stated.

The latest development, occurring as the

SPEED GOVERNOR CONTROL *of Braking Ratios*



Braking Ratio

The relation between the braking force applied to the wheel and the car weight expressed in percentage. Thus—

150% BRAKING RATIO—1½ TIMES THE CAR WEIGHT

250% BRAKING RATIO—2½ TIMES THE CAR WEIGHT

150% BRAKING RATIO

Used in Regular Passenger Service

For brake equipments where the braking ratio cannot be regulated, experience has shown that 150% is the maximum that can be employed. This became established when 60 M.P.H. was the maximum train speed.

HIGHER BRAKING RATIOS

Required for Stops from Higher Speeds

The chart below shows the stop distance relation if the customary 150% braking ratio were used for stops from higher speeds. With an increase in speed of 25 M.P.H. the stop distance is about doubled. This is because of the tremendous increase in energy developed within the train at the higher speed. Therefore, to shorten the stop distance, it is necessary to use higher brake shoe forces.

On modern high speed trains braking ratios up to 250% are solving the problem.

But the increased braking ratios assuredly would cause wheel sliding at the lower speeds if the higher ratios were maintained throughout the stop or used at the lower speeds, as followed in regular service with a constant 150% braking ratio.

Stop Distance from 60 M.P.H.

Stop Distance from 85 M.P.H.

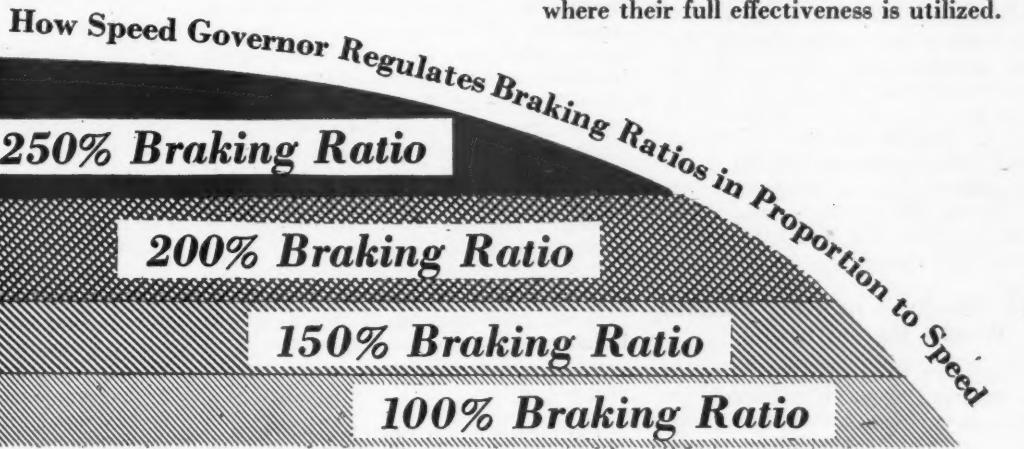
**150% Braking Ratio Remains
Constant Throughout Stop**

WESTINGHOUSE AIR BRAKE

for Shorter, Smoother Stops from HIGH SPEEDS

Speed
M.P.H.

100



High Braking Ratios Used Only at High Speeds

Above 65 M.P.H. the Braking Ratio is 250%.

From 65 M.P.H. this Braking Ratio is gradually reduced to 200%.

From 40 M.P.H. the 200% Braking Ratio is gradually reduced to 150%.

From 20 M.P.H. the 150% Braking Ratio is gradually reduced to 100%.

One Speed Governor per car is recommended in order to provide maximum flexibility with respect to train consist.

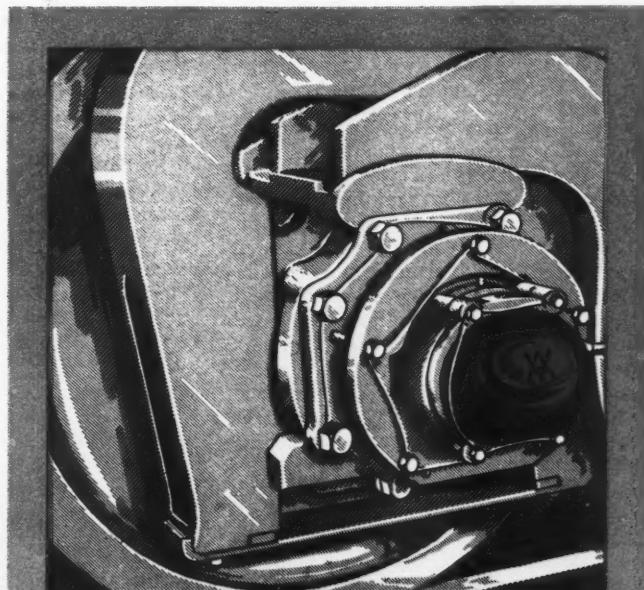
Decelostat Control

Wheel slip protection can be associated with speed governor control.

SPEED GOVERNOR CONTROL, therefore, was developed and is used on practically all the modern high speed trains to confine the high braking ratios to the higher speeds where their full effectiveness is utilized.

Smooth Stops From Any Speed

The gradual reduction in braking forces, proportional to speed change, maintains a uniform rate of retardation, eliminating surge generally associated with the stop.



COMPANY • Wilmerding, Penna.

Railway Age went to press, was the sending of a letter to stockholders by 8 of the 13 directors, who charged that the plan advanced by Mr. Boatner for refinancing would cost the railroad \$118,440 more than would be needed under the optional provisions of the present first mortgage and solicited stockholders to support the present management.

Another Proposed Revision of Civil Aeronautics Act

Representative King, Democrat of California, on April 17 introduced in the House H.R. 4608, a bill incorporating a large number of changes in the existing Civil Aeronautics Act, and differing in various respects from other pending bills for that purpose, including H.R. 3420 and H.R. 3421, introduced, respectively, by Representatives Lea of California and Bulwinkle of North Carolina, Democrats. Mr. King's bill would create an independent Civil Aeronautics Authority and an independent Air Safety Board, and would provide for a so-called American flag airline to engage in international commerce.

"Black Market" in Rail Tickets Would Be Outlawed

Representative Lea, Democrat of California, chairman of the House committee on interstate and foreign commerce, has introduced a bill—H.R. 4573—to amend the Interstate Commerce Act to make "black market" operations in the sale of railway tickets or reservations a federal offense.

This would be accomplished by making it illegal, under penalty of fine or imprisonment, for any railroad employee to solicit or receive any form of gratuity, over the published fare, in connection with the sale or reservation of such tickets, and by authorizing the Interstate Commerce Commission, upon complaint or on its motion, when conditions so require, to establish maximum service charges that persons other than employees of the carriers may collect for obtaining or making reservations for railway transportation, and to demand suitable security to insure the financial responsibility of persons performing such services.

I. C. C. Service Orders

Restrictions on the shipment in carload lots of old potatoes, other than sweet potatoes, have been made more stringent by Service Order No. 197 of the Interstate Commerce Commission, effective April 21.

As reported in *Railway Age* of March 25, page 614, the commission, by its Service Order No. 187, issued upon the advice of the War Food Administration, prohibited railroads from handling refrigerator cars loaded with specified inferior grades of potatoes originating in 24 northern and western states, except when intended for seed purposes. This order has been set aside by Service Order No. 187-A, effective at the same time Service Order No. 197 became operative.

The new order, also issued upon the recommendation of the War Food Administration, and in addition upon the request of the Office of Defense Transportation that the commission cooperate with it to pre-

vent wasteful transportation of such low grade and cull potatoes, provided that railroads shall not handle refrigerator or box cars loaded with potatoes, other than sweet-potatoes, of the grades specified, originating in the same 24 states. Seed potatoes again were excepted from the prohibition, and in addition the order provided that box cars may be used for the movement of potatoes grading below the specified minimum when the shipment is consigned to a manufacturing plant for manufacturing purposes only or to livestock feeders or feed processors for use as livestock feed and the bill of lading therefor is properly endorsed.

Service Order No. 198, effective April 17, required the Louisville & Nashville to unload one car containing furnace slag on hand at Memphis, Tenn., "an unreasonable length of time." Service Order No. 199, effective April 18, directed the New York Central to forward over the most available routes freight routed over its line between St. Francisville, Ill., and Vincennes, Ind., due to carrier's inability resulting from damage to bridge abutments caused by flood conditions at Vincennes.

Amendment No. 2 to Service Order No. 189, restricting back haul and out-of-line haul of grain moving in transit, effects further modifications in the listing of tariff items specified in the appendix to the original order.

Container Committee Offers Car Use Suggestions

The War Production Board has disclosed that the transportation industry advisory committee for its Containers Division has suggested that the W. P. B. "explore the possibilities of having unloaded cars move more rapidly." Discussions in a recent committee meeting also dealt with reports that greater efficiency in the use of cars could be attained if procedures could be developed to speed the release of loaded cars held awaiting bills of lading from government purchasing agencies, the announcement went on to say, and a list of instances of such delays is being compiled, it added.

Another suggestion resulting from the same committee meeting was that "further steps be taken" to have the doors of empty cars closed promptly, so car interiors will not be exposed to storms that necessitate a drying-out period before they can be loaded.

Abandonment Hearings May 2

The public hearings before a subcommittee of the Senate committee on interstate commerce on the bill (S. 1489) introduced by Senator Reed, Republican of Kansas, "to establish additional standards and to declare the policy of Congress with respect to the abandonment of railroad lines," scheduled to begin April 27, have been postponed to May 2.

The same subcommittee, composed of Senators Johnson of Colorado, chairman, and Clark of Idaho, Democrats, and Mr. Reed had also scheduled hearings on April 27, on Senate Resolution 278, but it was undecided whether this schedule would be followed. Such hearings would be held to consider the allegations of V. V. Boatner, former director of the Division of Railway Transport of the Office of Defense Trans-

portation, that the Reconstruction Finance Corporation has exercised pressure on the management of the Chicago & Eastern Illinois to block the reduction of that road's debt and in other ways to interfere with its policies.

Would Do Away with Parity in Western Grain Rates

Rate changes on carload shipments of feed grains, corn, oats, barley, and certain products thereof, and sorghum grains, proposed by railroads in Western Trunk Line Territory, to apply between specified areas in Iowa, Minnesota, South Dakota, Missouri, Kansas, Nebraska, Colorado and Wyoming, have been found by a majority of the Interstate Commerce Commission to be unreasonable and ordered canceled. The order was issued in I. & S. No. 5236, with Commissioner Splawn concurring in the result and Commissioner Johnson dissenting.

The proposed schedules would have canceled existing temporary emergency rates on the specified coarse grains and products, used for feeding purposes, and in lieu thereof would have made so-called normal rates applicable generally on wheat and coarse grains, whether for feeding purposes or not. Such parity in rates was required by a commission order in its No. 17000 proceedings, part 7, but temporary departure from parity was authorized by the commission effective June 1, 1941, "to meet an alleged emergency said to have been brought about by competition with itinerant or merchant truckers." The temporary rates averaged about 70 per cent of the normal rates.

The railroads contended that the commission's denial of their petition for a further extension of the below-parity rates left them with no alternative but to reinstate the prescribed normal rates. This proposal was opposed by the Office of Price Administration and various shipping interests and organizations in the area involved, however, and the suspension proceedings followed. Finding that the normal rates are, in most instances, too high to move whole grains against the present severe truck competition, the majority of the commission has nevertheless taken the position that the emergency rates are preferential of certain commodities, shippers and territories, "and are also in contravention of our consistent findings that rates may not be predicated upon the use to which a commodity is to be put," and so has invited the carriers and shippers to "endeavor to work out a modified permanent adjustment which will fit the needs of the traffic and eliminate to the fullest possible extent the discrepancies" referred to.

The order canceling the proposed schedules was entered without prejudice to the filing of other schedules in conformance with these views of the majority, and at the same time the commission issued an order to "show cause" why the parity provisions of the order in No. 17000, part 7, should not be permanently set aside throughout the western district. Returns to the show cause order are due May 15, and meanwhile the suspension of the parity requirement, as applied to the feed grain

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in question, has been extended to January 1, 1945.

In his dissent, Commissioner Johnson took the position that the commission should "prescribe a proper basis of rates" to bring to a conclusion "a difficulty of our own making . . . solely attributable to the fact that over a period of years we have repeatedly declined to prescribe reasonable rates on coarse grains within this limited portion of Western Trunk Line Territory." The "inevitable result" of what he termed the "evasive action" of the majority in shifting responsibility for a permanent adjustment of the rates to the parties involved, rather than itself prescribing appropriate rates, Commissioner Johnson said would be "a continuing series of expensive proceedings having to do with the continuance of highly improper 'emergency reduced rates'."

Railway Tie Association Annual Meeting

The Railway Tie Association will hold its twenty-ninth annual meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, on May 16-17. In developing the program for this meeting, the officers of the association have endeavored to key it to the critical problems of supply now confronting those in the industry and also to consider postwar problems and prospects. The program follows:

TUESDAY, MAY 16
Morning Session

Opening business
Report of Committee on Manufacturing Practice
Address on Effect of Increasing Speed of Trains
on Crossties After the War, by J. B. Akers,
assistant chief engineer, Southern, Washington,
D. C.
Report of Committee on Mechanical Equipment
Address on Price Ceilings on Crossties, by Peter
Stone, price executive, Lumber Pricing Branch,
Office of Price Administration, Washington,
D. C.

Luncheon—12:30 p.m.

Address by Albert C. Mann, vice-president, purchases and stores, Illinois Central, Chicago

Afternoon Session

Report of Committee on Timber Conservation
Report of Legislative Committee
Address on Purchasing Crossties in the Postwar
Period, by D. C. Curtis, chief purchasing officer, Chicago, Milwaukee, St. Paul & Pacific, Chicago
Report of Committee on Specifications and In-
spection

Annual Dinner—7:00 p.m.

WEDNESDAY, MAY 17
Morning Session

Report of Committee on Checking and Splitting
Address on Requirements of Crossties After
World War I Compared with Prospects After
World War II, by M. E. Towner, general purchasing agent, Western Maryland, Baltimore, Md.
Report of Committee on Government Regulations
Address on the Outlook for Crosstie Production
During the Next Twelve Months by R. Van
Metre, president, Wyoming Tie & Timber Co., Chicago
Report of the representative of the Railway Tie
Association on the Lumber and Timber Products
War Committee
Closing business

Representation of Employees

The National Mediation Board has certified the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees to represent, for the purposes of the Railway Labor Act, the clerical, office, station and storehouse employees of the McKeesport Connecting, these employees, not previously

represented, having selected that organization by ballot. The National Council Railway Patrolmen's Union, A. F. of L., has been named the representative of the patrolmen in the police department of the Los Angeles Union Passenger Terminal, by the vote of 14 of the 17 employees so classed.

The board has announced that the American Train Dispatchers' Association has been selected by the train dispatchers (including train controllers) of the Nashville, Chattanooga & St. Louis as their representative, this union having received 20 votes to one vote cast for the Order of Railroad Telegraphers. As noted in *Railway Age* of April 15, page 747, the board recently determined that the train controllers, that is, employees assigned to operate centralized traffic control systems, performed work within another definitely established craft or class, that of the dispatchers, and that their votes should be counted along with those of the dispatchers in determining their representative, even though the O. R. T. had an agreement with the road covering the disputed group of employees. The votes of eight train controllers were counted with the other ballots cast in this election, as directed by the board.

The machinists of the St. Louis-San Francisco and St. Louis, San Francisco & Texas, and their helpers and apprentices, by a vote of 794 to 49 have chosen the International Association of Machinists, operating through the Railway Employees' Department, A. F. of L., as their representative, replacing the Brotherhood of Railroad Shop Crafts of America. The same roads' electricians and their helpers and apprentices have voted 66 to 8 for representation by the International Brotherhood of Electrical Workers, also operating through the A. F. of L. Railway Employees' Department, instead of the Brotherhood of Railroad Shop Crafts of America, in an election under N. M. B. procedures.

Milwaukee Offers Prizes to Promote Loss Prevention

In keeping with the spirit of the Perfect Shipping campaign sponsored by the National Association of Shippers Advisory Boards and in an effort to prevent loss of freight on the railroads, the Chicago, Milwaukee, St. Paul & Pacific is offering its employees, during April, four \$25 war bonds for the best letters on the subject of loss prevention and 10 prizes of \$10 each in war stamps for the ten best suggestions on the subject. The contest is an attempt to encourage employees to offer ideas that will be helpful in the operation of the railroads.

For the second year, H. A. Scandrett, president of the Milwaukee, who has taken special interest in developing the road's contribution to the Perfect Shipping Campaign, has appointed a committee to emphasize during April the importance of the prevention of loss and damage. This committee consists of W. L. Ennis, assistant to the chief operating officer; H. S. Zane, assistant freight traffic manager; G. W. Loderhose, freight claim agent; and F. J. Newell, assistant public relations officer.

The committee has arranged at least one "perfect shipping" meeting on each of 18 divisions during April. This is in addition to the regular monthly loss and damage

prevention meetings held on each division. In addition, it has encouraged careful handling meetings in each yard and luncheon or dinner meetings of agents at larger points. As a further aid to promote the campaign, service clubs have made Perfect Shipping the theme for their April meetings and train dispatchers each morning put out a general message calling attention to the campaign and emphasizing important fundamentals of loss prevention.

Air Express Shipments Up

Combination rail-air express shipments increased 18.6 per cent in February, the air express division of Railway Express Agency reports. There were 35,111 shipments carried in the combined service, compared with 29,614 for the same month a year ago. Express charges on this traffic rose 17.7 per cent over February, 1943.

A. S. M. E. Schedules Pittsburgh Meeting, June 19-22

The semi-annual meeting of the American Society of Mechanical Engineers is to be held at William Penn Hotel, in Pittsburgh, June 19 to 22, inclusive. The program will encompass discussion of problems confronting transportation, industry, production, and management. Also promised are a number of side inspection trips of industrial plants in the area.

Equipment and Supplies

FREIGHT CARS

The GEORGIA RAILROAD has ordered 100 hopper cars and 75 box cars from the Pullman-Standard Car Manufacturing Company.

The ATLANTA & WEST POINT has ordered 25 box cars from the Pullman-Standard Car Manufacturing Company.

The PACIFIC FRUIT EXPRESS plans to spend \$5,500,000 in 1944 for the purchase of 1,000 refrigerator cars and \$9,000,000 for the general repair and maintenance of existing equipment. The planned purchase of the refrigerator cars was originally reported in the *Railway Age* of March 4.

SIGNALING

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has placed an order with the Union Switch & Signal Co., covering the signaling materials for installation of a centralized traffic control system between Nashville, Tenn. and Bruceton. This territory comprises 92 miles of single track and the c.t.c. machine for handling the two wire code system will be located at Bruceton, the western end. Signals will be of the color light P-5 type with style M22-B dual control low voltage electric switch movements at controlled locations. All main line non-interlocked switches will be equipped with electric locks controlled from the c.t.c. machine. The order also involves all relays, rectifiers, transformers, switch boxes, and housings for code controlled and intermediate signal locations.

Construction

Denver & Rio Grande Western Improvement Program for 1944

The Denver & Rio Grande Western has completed plans for an extensive improvement and construction program for 1944 which includes the following projects at an estimated total cost exceeding \$4,000,000: Additional tracks and track changes and installation of two-way communication system in the yard at Roper, Utah; extension of central control system throughout the yard, replacement of passenger depot, replacement of water treating plant, track changes, and installation of coaling and sanding facilities at Helper, Utah; line changes from 6th West Street to 4th West Street and construction of a drop pit and drop table at Salt Lake City, Utah; construction of yard office, dock for motorway trucks, replacement of brick floor in the roundhouse with concrete, extension of six stalls of roundhouse, and replacement of the 100-ft. turntable with a 130-ft. turntable at Pueblo, Colo.; replacement of concrete roof in roundhouse with timber and installation of a boiler washing system at Burnham, Colo.; construction of five cottages for employees and replacement of the passenger depot at Minturn, Colo.; extension of passing track at Gilluly, Utah; rearranging and remodeling of track layout and interlocking plant at South Denver, Colo.; installing of CTC, including passing track extensions from Grand Junction, Colo., to Agate, Utah; improvements to depot and yard offices at Provo, Utah; reconstruction of water facilities at Bond, Colo.; construction of water treating at Thistle, Utah; construction of second main line from Dern, Utah, to Delhi; slag ballasting from Bond, Colo., to Sylvan; extension of track and track changes, including signals at Bond, Utah.

CANADIAN PACIFIC.—This road has awarded a contract to T. H. Bell, Vancouver, B. C., for the rebuilding of 12 frame trestle bridges on the Carmi and Coquihalla subdivisions in British Columbia. The contract is for labor only.

CANADIAN PACIFIC.—This road has awarded two contracts to the General Railway Signal Company, Rochester, N. Y., for the installation of A. P. B.-type automatic block signals on approximately 85 miles of single track between Swift Current, Sask., and Maple Creek, and a similar installation on approximately 28 miles of single track between Medicine Hat, Alta., and Suffield.

CANADIAN PACIFIC.—This road is seeking the authority of Parliament to extend the Kettle Valley railway line from Haynes to Osoyoos, B. C., a distance of about 10 miles. It is proposed to issue securities not exceeding \$50,000 per mile, to cover cost of the proposed project. The extension would serve the fruit-growing district of southern British Columbia.

CANADIAN NATIONAL.—The Canadian National has awarded a contract to build

its new belt line from Bout de L'ile to Eastern Junction, on Montreal Island, to C. A. Pitts, General Contractors, Ltd. Preliminary work on the right of way is being started now with local labor. The cost of construction of the new line, which is about 14 miles in length, is estimated at \$2,870,000. R. C. Vaughan, president of the road, said the line would improve the service given to industries in the eastern and western sections of the island; open new industrial sites to development; make possible the residential development of a large area in the northeast section of the island, and give passenger trains from Chicoutimi, Lake St. John and other north shore points direct access to the central station. It will shorten by 76 miles the distance now covered by freight trains between Longue Pointe and Turcot Yard and will make possible the abandonment of 32 miles of track on the Montford-Joliette line, which was authorized by the Board of Transport Commissioners in 1940; an abandonment which will result in the recovery of 6,200 tons of steel, as compared with 6,000 tons needed to build the new line.

GREAT NORTHERN.—This road has awarded contracts, totaling \$1,300,000, for a line change east of Belton, Mont., in the canyon of the Flathead River. The project includes the construction of three tunnels with an aggregate length of one-half mile and is designed to reduce the curvature of some six degree curves and sharper to three and four-degree curves. This project is separate from the line change which the Great Northern completed last year a short distance west of Belton.

NEW YORK CENTRAL.—The Michigan State Highway Department has awarded a contract, amounting to \$137,521, to the W. J. Storen Company, Detroit, Mich., for the construction of a reinforced concrete highway underpass to carry the Middle Belt Highway under the New York Central tracks at Inkster, Mich. The structure consists of a single span bridge with double track on build-up longitudinal girders. The highway at this point is to be paved 42 ft. wide between curbs and two 5-ft. sidewalks are to be provided throughout the grade separation cut. The first contract for this project, covering furnishings and fabrication of structural steel, amounting to \$29,322, was awarded in 1942 to the Bethlehem Steel Company.

READING.—This road has awarded contracts for improvements to drainage facilities in Plainfield, N. J., at an estimated cost of \$20,385, to the Delta Construction Company of Hopewell, N. J., and for constructing portions of concrete abutments and filling portions of the wooden trestles of two bridges in Williamsport, Pa., at an estimated cost of \$50,610, to Charles Riebe of Lansford, Pa.

SEABOARD AIR LINE.—This road has authorized the erection of 10 steel deck plate girder spans at the Nottoway River bridge near McKenney, Va., at an estimated cost of \$60,000, and grading for a proposed line revision at Whitmire, S. C., at an estimated cost of \$21,500.

WESTERN PACIFIC.—This road has awarded a contract, amounting to \$48,600, to

Barrett & Hilp, San Francisco, Calif., for the construction of a roundhouse extension and a turntable at Oakland, Calif. The Western Pacific will furnish all material so the total cost of the project will be approximately \$100,000.

WABASH.—This road has awarded a contract, amounting to \$73,000, to the Roberts and Schaefer Company, Chicago, for the construction of a coaling station, cinder plant and sanding facilities at Montpelier, Ohio.

WAR DEPARTMENT.—The U. S. Engineer office, Los Angeles, Calif., has awarded a contract, amounting to \$23,657, to Shannahan Brothers, Inc., Huntington Park, Calif., for the construction of a spur track and facilities in California.

Supply Trade

The Briggs Clarifier Company of Washington D. C., has been awarded a star to add to its Army-Navy "E" pennant for continued outstanding production efficiency.

Henry F. Binder, of the headquarters sales department of the Locomotive and Ordnance division of the **Baldwin Locomotive Works**, has been transferred to the Chicago district office.

H. W. Davis, of the sales division of the **Cleveland Tractor Company**, Cleveland, Ohio, has been promoted to assistant industrial sales manager. Mr. Davis entered business as a service man of the H. F. Davis Tractor Company and later headed



H. W. Davis

up the sales division of that company. From 1935 to 1939 he was a dealer in Pittsfield, Mass., and on the latter date became district sales engineer of the Cleveland Tractor Company at New York. For the last two years he has been with the sales division of this company at Cleveland.

George F. Endicott, railway equipment designer and engineering consultant, has joined **Erwin, Wasey & Company, Ltd.**, Chicago, as technical advisor. Mr. Endicott was graduated from Purdue Uni-

H S G I Wear Resisting PARTS



For Streamlined Performance

EVERY plan in the design of locomotives for streamlined passenger service has taken into consideration the strength and wear-resisting qualities of vital parts.

To insure utmost efficiency and economy of operation railroads have installed HUNT-SPILLER Air Furnace GUN IRON parts on most all of the power in this class of service.

Even the performance of this power is streamlined when the valves and cylinders are equipped with HSGI Bushings, Bull Rings and Packing Rings. Installation of HSGI parts in the cylinders and valves effects economies in fuel and maintenance.



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versity. For many years he was car and locomotive designer, assistant master car builder and mechanical engineer for the Northern Pacific at St. Paul, Minn., and later served with Hydraulic Controls, Inc., a division of the New York Air Brake Company.

W. A. Roberts, manager of the Tractor division; **William C. Johnson**, general sales manager of the General Machinery division; and **James M. White**, general works manager of the **Allis-Chalmers Manufacturing Company**, have been elected vice-presidents.

Mr. Roberts has been actively connected with the Allis-Chalmers Tractor division



W. A. Roberts

for 20 years. Starting as a blockman out of the Wichita (Kansas) branch, he served in various capacities until 1931, when he was appointed general sales manager of the Tractor division. In 1941 he was promoted to manager of the Tractor division, a title which he still retains with his promotion to vice-president.

Mr. Johnson, a native of Birmingham, Ala., joined the Allis-Chalmers organization in 1924 as a field engineer in its mining and cement making machinery divisions. He entered the sales department in 1929 at



William C. Johnson

the company's Atlanta, Ga., office, and in 1937 became manager of the Knoxville, Tenn., district office. In 1940, he was placed in charge of sales for the Crushing and

Cement Machinery department at Milwaukee, Wis., and in 1942 was appointed general sales manager of the General Machinery division. As vice-president he will con-



James M. White

tinue in charge of sales of all products excepting those of the Tractor division.

Mr. White, also an Alabaman by birth, joined the company's manufacturing department in 1929. Later he successively served as acting works manager at the La Crosse plant and works manager at the LaPorte plant. In 1941 he was promoted to general works manager in charge of manufacturing. As vice-president, he will direct the company's manufacturing activities at all plants.

Robert S. Archer, chief metallurgist, Chicago district for the Republic Steel Corporation, has been appointed metallurgical assistant to the vice-president of the **Climax Molybdenum Company**.

Frank M. Blum, assistant manager of the P & H Crane Sales Division of the **Harnischfeger Corporation**, has been appointed manager of that division to succeed **Ben Van Horn**, who has retired after 47 years of continuous association with the company. Mr. Blum joined Harnischfeger in 1929.

The **Electric Storage Battery Company** has been awarded a fourth star to add to its Army-Navy "E" pennant for continued excellence in production.

The annual stockholders' meetings of the **Brill Corporation** and of the **American Car & Foundry Motors Co.** have been postponed until July 27 when, it is expected, a definite estimate of the effect of renegotiation proceedings now under way can be included in the financial statements. A plan for the merger of the motors company into the Brill Corporation and for recapitalization of the latter will be put before the meeting.

The **H. K. Porter Company, Inc.**, Pittsburgh, Pa., has appointed three new district managers as follows: **Joseph F. Gaffney**, Rochester, N. Y., serving northern New York; **R. W. Steves**, Cincinnati, Ohio, serving major portions of Ohio, Kentucky, West Virginia and Indiana; and **W. T. Campbell**, Philadelphia, Pa., covering western New Jersey, eastern Penn-

sylvania and Delaware. **J. L. Cunningham**, Union, N. J., has been appointed field service engineer, for the Chemical Process and Quimby Pump divisions of Porter in northern New Jersey, with headquarters at Newark, N. J.

E. S. Weidle, general manager of sales for the **Pittsburgh Steel Foundry Corporation**, has been appointed vice-president in charge of sales and **Walter White**, plant manager, has been appointed vice-president in charge of production.

C. D. Stewart, chief engineer for the **Westinghouse Air Brake Company**, Wilmerding, Pa., has been appointed direc-



C. D. Stewart

tor of engineering. Mr. Stewart received his technical education at Pennsylvania State College. He has been associated with the company since 1913. He served on the west coast as mechanical expert in San Francisco, Calif., and as district engineer and vice-president of the Westinghouse Pacific Coast Brake Company until his transfer to Wilmerding as chief engineer. **Ellis E. Hewitt** has been appointed chief engineer to succeed Mr. Stewart. Mr. Hewitt has been associated with the company for 33 years. He received his technical training at the Carnegie Institute of Technology



Ellis E. Hewitt

and served in a succession of engineering positions, including chief design engineer before being appointed assistant chief engineer in 1940.

SAFETY & COMFORT

at

HIGH SPEED



A.A.R. TIGHTLOCK COUPLERS

Eliminate slack in coupler contour.

Eliminate noise caused by coupler slack.

Interlocking feature prevents telescoping and turning over of cars.

Improved anti-creep arrangement, and A. A. R. No. 6
operating mechanism prevents train separation.

Will couple with present standard and M. C. B. type
couplers, and when so coupled provides substantial
reduction in contour slack.

Wear of coupler head and parts is materially reduced, thus increasing the service life.



NATIONAL MALLEABLE AND STEEL CASTINGS CO.

General Offices: CLEVELAND, OHIO

Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco.

Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

Financial

KANSAS CITY SOUTHERN.—*Annual Report.*—The 1943 annual report of this road shows a net income, after interest and other charges, of \$2,848,533, as compared with a net income of \$2,541,785 in 1942. Selected items from the income statement follow:

	1943	Increase or Decrease Compared with 1942
Average Mileage	878.32	-1.56
Operated RAILWAY OPERATING REVENUES	\$43,219,033	+\$8,902,685
Maintenance of way and structures	7,046,018	+196,952
Maintenance of equipment	5,770,071	+1,353,225
Transportation	11,081,531	+2,805,808
TOTAL OPERATING EXPENSES	26,054,070	+4,762,718
Operating ratio	88.46	+2.24
NET REVENUE FROM OPERATIONS	17,164,963	+4,139,968
Railway tax accruals	9,013,770	+3,128,603
RAILWAY OPERATING INCOME	8,151,192	+1,011,365
Equipment rents, Net Dr.	3,036,598	+754,928
Joint facility rents, Net Dr.	125,456	-2,893
NET RAILWAY OPERATING INCOME	4,989,139	+259,329
Other income	771,308	+52,924
TOTAL INCOME	5,760,446	+312,252
Rent for leased roads and equipment	22,969	+6,091
Interest on funded debt—Fixed interest	2,795,789	+5,545
TOTAL FIXED CHARGES	2,868,296	-10,437
NET INCOME	2,848,533	+306,748
DISPOSITION OF NET INCOME:		
Dividend appropriations of Income Preferred Stock	420,000	.....
INCOME BALANCE TRANSFERRED TO EARNED SURPLUS	2,428,533	+306,748

ATLANTIC & EAST CAROLINA.—*Modification of Lease.*—Division 4 of the Interstate Commerce Commission has approved a modification of the lease under which this road operates the Atlantic & North Carolina to give effect to provisions for the conditional repayment of certain advances made in connection with the rehabilitation of its line to meet the needs of the Navy's Cherry Point, N. C., facilities.

BOSTON & MAINE.—*Acquisition of Subsidiary.*—This company has applied to the Interstate Commerce Commission for authority to acquire the property of the Peterborough Railroad, which it controls by ownership of all except 70 shares of the outstanding capital stock.

CHESAPEAKE & OHIO.—*Preference Stock.*—The Interstate Commerce Commission has denied this company's application for reconsideration by the full commission of the denial by Division 4, reported in *Railway Age* of December 25, 1943, page 1022, of its request for authority to issue as a stock dividend \$76,573,700 of preference stock.

COLORADO & SOUTHERN.—*Extension of Mortgage.*—The Wichita Valley, controlled

by this company through ownership of its capital stock, has been authorized by Division 4 of the Interstate Commerce Commission to extend the maturity date of \$769,000 of first mortgage bonds, held by the Colorado & Southern, to July 1, 1955.

CENTRAL OF GEORGIA.—*Annual Report.*—The 1943 annual report of this road shows a net income, after interest and other charges, of \$1,940,663, as compared with a net income of \$3,983,779 in 1942. Selected items from the income statement follow:

	1943	Increase or Decrease Compared with 1942
Average Mileage	1,815.65	.....
Operated RAILWAY OPERATING REVENUES	\$38,929,768	+\$9,426,683
Maintenance of way and structures	4,008,925	+1,171,024
Maintenance of equipment	4,959,912	+623,939
Transportation—Rail line	11,874,977	+2,055,132
TOTAL OPERATING EXPENSES	23,179,867	+4,210,054
Operating ratio	59.54	-4.76
NET REVENUE FROM OPERATIONS	15,749,901	+5,216,630
Railway tax accruals	7,976,012	+5,467,715
RAILWAY OPERATING INCOME	7,773,889	-251,086
Equipment rents, Net Dr.	306,082	+117,099
Joint facility rents, Net Dr.	122,251	-1,762
NET RAILWAY OPERATING INCOME	7,345,556	-366,423
Non-operating income	673,142	-71,726
GROSS INCOME	8,018,698	-438,150
Rent for leased roads and equipment	1,384,117	+154,963
Interest on funded debt	3,103,800	+143,429
TOTAL DEDUCTIONS FROM GROSS INCOME	6,078,034	+1,604,966
INCOME BALANCE TRANSFERRED TO PROFIT AND LOSS	1,940,663	-2,043,115
SOUTHERN. — <i>Annual Report.</i> —The 1943 annual report of this road shows a net income, after interest and other charges, of \$23,528,589, as compared with a net income of \$33,388,868 in 1942. Selected items from the income statement follow:		
Average Mileage	6,513.72	-0.7
Operated RAILWAY OPERATING REVENUES	\$245,532,051	+\$40,926,470
Maintenance of way and structures	26,916,811	+7,253,969
Maintenance of equipment	37,125,333	+6,255,817
Transportation	62,008,204	+7,190,457
TOTAL OPERATING EXPENSES	136,604,153	+22,857,416
Operating ratio	84.32	+8.45
NET REVENUE FROM OPERATIONS	108,927,898	+18,069,054
*Taxes	70,437,236	+28,948,841
Hire of Equipment	1,608,717	-487,071
Joint facility rents	1,137,188	+128,346
NET RAILWAY OPERATING INCOME	35,744,757	-10,521,061
Total other income	2,843,218	-337,186
TOTAL INCOME	38,587,975	-10,858,247
Rent for leased roads and equipment	2,996,100	+377,727

Interest on funded debt	11,664,650	-1,343,069
TOTAL FIXED CHARGES	14,720,360	-974,513
NET INCOME	23,528,589	-9,860,279

DISPOSITION OF NET INCOME:		
Income appropriated for dividends on preferred stock	3,000,000	.....
BALANCE TRANSFERRED TO EARNED SURPLUS	20,528,589	-9,860,279

* After Deduction of Post War Refund of Excess Profits Tax.

PENNSYLVANIA.—*Refinancing.*—This road's wholly-owned subsidiary, the Pennsylvania Company, has applied to the Interstate Commerce Commission for authority to issue \$35,000,000 of notes, sold at par to certain insurance companies and banks, the proceeds of which are to be used, together with funds in its treasury, to retire in advance of maturity the \$46,000,000 outstanding of its 4 per cent bonds of 1935. The new notes would include \$15,000,000 of serial notes, series A, to mature in equal annual installments over a 10-year period, with interest rates varying from 1 per cent to 2.3 per cent, and \$20,000,000 of 25-year 3 1/4 per cent series B notes. By replacing the outstanding bonds with the new securities an aggregate saving in interest charges of about \$11,000,000 is anticipated, while a reduction of about \$4,800,000 in the company's 1944 federal taxes will be effected, it is estimated.

Average Prices Stocks and Bonds

	Last April 18	Last week	Last year
Average price of 20 representative railway stocks..	38.83	40.65	36.47
Average price of 20 representative railway bonds..	87.24	88.06	76.23

Dividends Declared

ATLANTIC COAST LINE.—5% non-cum. preferred, \$2.50, semi-annually, payable May 10 to holders of record April 24.

CULVER & PORT CLINTON.—10¢, semi-annually, payable August 25 to holders of record August 15; extra, 10¢, payable May 25 and November 25 to holders of record May 15 and November 15, respectively.

ELMIRA & WILLIAMSPORT.—\$1.14, semi-annually, payable May 1 to holders of record April 20.

ERIE.—\$5.00 preferred A, \$1.25, quarterly, payable June 1, September 1, and December 1, to holders of record May 17, August 17, and November 17 respectively.

ILLINOIS CENTRAL.—Leased Lines, 4% gtd., \$2.00, semi-annually, payable July 1 to holders of record June 10.

KALAMAZOO, ALLEGAN & GRAND RAPIDS.—\$2.95, semi-annually, payable October 1 to holders of record September 15.

NORTHERN OF NEW HAMPSHIRE.—\$1.50, quarterly, payable April 29 to holders of record April 13.

PITTSBURGH, BESSEMER & LAKE ERIE.—75¢, semi-annually, payable October 1 to holders of record September 15.

SOUTHERN.—5% non-cum. preferred, \$1.25, quarterly, payable June 15 and September 15 to holders of record May 15 and August 15, respectively.

WIRGINIAN.—6% preferred, 37 1/2¢, quarterly, payable May 1 to holders of record April 15.

WABASH.—Common, \$1.00; 4 1/2% preferred, \$4.50, annually; both payable April 21 to holders of record March 31.

WHEELING & LAKE ERIE.—4% pr. in., \$1.00; 5 1/2% preferred, \$1.37 1/2; both payable May 1 to holders of record April 24.

Abandonments

MINNEAPOLIS, ANOKA & CUYUNA RANGE.—Division 4 of the Interstate Commerce Commission has authorized this road to abandon its line from a point near Nelson, Minn., to Anoka, 13.13 miles, which already has been dismantled after being requisitioned by the War Production Board.

SR-4

STRAIN GAGES

New Types AND New Low Prices

Type	Effective Gage Length Inches	Trim Width Inches	Resistance Ohms Approx.	Gages Per Set	Selling Price Per Gage
A-1	13/16	11/32	120	12 & 50	\$0.50
A-3	13/16	11/32	120	10	0.75
A-6	1/2	9/32	120	10	0.85
A-7	1/4	3/16	120	10	1.45
A-8	1/8	1/4	120	10	1.90
A-9	6	5/16	300	5	0.95
A-11	1-1/16	1/4	120	50	0.50
A-12	1	1/8	120	10	1.20
A-13	3/8	5/16	350	10	2.30
A-14	3/8	5/16	500	10	2.45
AB-1	15/16	3/8	350	5	2.50
AB-5	1/2	3/16	7.5	5	2.50
AB-7	1/4	3/16	120	5	3.00
AB-11	1/8	1/4	120	5	3.50
C-1	1-1/16	9/32	500	10	0.70
C-5	1/2	5/16	350	10	1.05
C-7	1/4	3/16	500	10	2.10
C-8	1/8	3/8	500	10	2.50
C-10	3/8	5/16	1000	10	2.20
C-11	1/8	0.3	500	10	2.60
C-14	3/8	1/2	2000	10	2.95
CB-1	15/16	3/8	1000	5	2.90
CB-5	1/2	3/16	200	5	2.90
CB-7	1/4	3/16	500	5	3.25
CB-8	1/8	3/8	500	5	3.50
CB-10	5/16	3/8	1000	5	3.70
CB-11	1/8	1/4	350	5	3.85
AR-1	13/16	Y Rosette	120	5	1.50
CR-1	1-1/16	Y Rosette	500	5	2.40
AR-3	13/16	T ▲ Rosette	120	5	2.45
AR-4	13/16	▲ Rosette	120	5	1.70
CR-4	1-1/16	▲ Rosette	500	5	2.50

MINIMUM ORDER—\$10.00 F.O.B. POINT—EDDYSTONE, PA.

Other gages in special types and sizes are available. Data on request. Dimensions are stable but subject to change without notice. Prices subject to change without notice. Write for Bulletin 175.

The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia, Penna., U. S. A. Offices: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, St. Louis, San Francisco, Houston.



BALDWIN
SOUTHWARK
TESTING EQUIPMENT

Railway Officers

EXECUTIVE

Hugh A. McAllister, whose promotion to assistant to the president of the Erie, with headquarters at Cleveland, Ohio, was reported in the *Railway Age* of April 8, attended the Central Teachers' College, Mt. Pleasant, Mich., and the University of Wisconsin, and graduated from the University of Michigan in 1912. He entered railway service on November 28, 1940, as director of sales training of the Erie, with headquar-



H. A. McAllister

ters at Cleveland, and on May 1, 1941, he was promoted to director of education, with the same headquarters. Mr. McAllister held that position until his new appointment, which became effective on April 1.

FINANCIAL, LEGAL AND ACCOUNTING

Frank S. Collins, assistant to vice-president of the Southern and vice-president of its subsidiaries, has been appointed general agent, real estate and conveyancing department, with headquarters at Washington, D. C. He is succeeded by **M. Hurt Ramsey**, whose appointment was announced in last week's *Railway Age*.

OPERATING

R. L. Butler has been appointed terminal superintendent, Seaboard Air Line, with jurisdiction of the Miami terminal area and headquarters at Miami, Fla.

D. E. Clark, superintendent, Mobile division, of the Southern, at Selma, Ala., has been transferred to the Winston-Salem division at Winston-Salem, N. C. He replaces **Julius S. Bergman**, who has retired from that position after 53 years of railroad service. **J. R. Formsby**, agent at Macon, Ga., has been named trainmaster of the Columbia division at Columbia, S. C. **A. E. Trayler**, train dispatcher of the Mobile division, has been appointed trainmaster of the Columbia division. **J. F. Beaver**, roadmaster of the Charlotte divi-

sion at Greenville, S. C., has been promoted to trainmaster, Danville division, replacing **L. L. Waters**. Mr. Waters has been transferred to the Washington division, at Charlottesville, Va., succeeding **O. B. Keister, Jr.**, whose promotion to superintendent was announced in last week's *Railway Age*. Mr. Bergman was born at Greensboro, N. C., on September 8, 1873. He entered the service of the Southern in April, 1891, as a telegraph operator at Clarksville, Va., and advanced in the operating department until he became trainmaster at Norfolk, Va., in 1906. Mr. Bergman was appointed superintendent at Norfolk in 1909, and assistant superintendent of the Winston-Salem division of the Atlantic & Yadkin in July, 1916, being named superintendent in 1918. From March, 1924, until his recent retirement, he has served as superintendent of the Winston-Salem division of the Southern, and also, since April, 1926, as chairman of the board of control of the Winston-Salem Terminal Company.

E. W. Headland, assistant division superintendent of the Pennsylvania and the Long Island, has been appointed superintendent of freight transportation, New York zone. He succeeds **G. F. Walter**, who has been promoted to the position of assistant to the general manager, New York zone.

John L. Kendall, superintendent of the Omaha-Northern Kansas divisions of the Missouri Pacific, with headquarters at Falls City, Neb., has been promoted to general superintendent of transportation, with headquarters at St. Louis, Mo., succeeding **C. R. Pedigo**, who has been granted a leave of absence to serve with the American Railroad Mission in Mexico. **W. Wicker**, superintendent of the Union Railway (part of the Missouri Pacific), with headquarters at Memphis, Tenn., has been transferred to Falls City, replacing Mr. Kendall.

H. E. Deitz, trainmaster of the Birmingham division of the Louisville & Nashville, has been promoted to assistant superintendent of the Evansville division, with headquarters at Evansville, Ind., succeeding **T. A. McDonald**, whose transfer to the Cincinnati division, with headquarters at Latonia, Ky., was reported in the *Railway Age* of March 25.

TRAFFIC

Harry J. Johnson has been appointed assistant general freight agent, in charge of export-import traffic, of the Missouri Pacific, with headquarters at New Orleans, La.

J. R. McAnally, assistant general agent, freight department, of the Union Pacific, with headquarters at Chicago, has been promoted to assistant to the general freight traffic manager, with headquarters at Omaha, Neb., a newly-created position.

R. E. Drummy, assistant traffic manager of the Union Pacific, with headquarters at Los Angeles, Calif., has been promoted to freight traffic manager, with headquarters at Omaha, Neb., succeeding **R. G. Owen**, who has been appointed assistant freight traffic manager at San Francisco, Calif. Mr. Owen relieves **Kenneth G. Carlson**, who has been appointed assistant traffic man-

ager, with headquarters at Los Angeles, replacing **Mr. Drummy**. **W. T. Price**, traffic manager, with headquarters at Denver, Colo., has been transferred to Los Angeles, succeeding **A. V. Kipp**, who has retired. Biographical sketches and photographs of Mr. Owen and Mr. Carlson were presented in the *Railway Age* of November 27, 1943, at which time they were promoted to freight traffic manager and assistant freight traffic manager, respectively.

C. G. Labus has been appointed industrial agent of the Lehigh Valley with headquarters at New York, succeeding **W. J. Donsbach**, whose promotion to the position of division freight agent was reported in the *Railway Age* of April 8.

D. H. Voltz, general agent, freight department, of the Union Pacific, with headquarters at New York, has been promoted to traffic manager, with headquarters at Chicago, succeeding to the duties of **W. T. Burns**, freight traffic manager, who has been transferred to Omaha, Neb. **C. A. Pollock**, general agent, freight department, at Chicago, has been advanced to general freight agent, with the same headquarters, a newly-created position. **M. W. Coonerty**, traveling freight and passenger agent, with headquarters at Boston, Mass., has been promoted to general agent, with the same headquarters, relieving **H. C. Yerger**, who has been transferred to New York, replacing Mr. Voltz. **Sam Reinhardt**, traveling freight and passenger agent, with headquarters at Tulsa, Okla., has been advanced to general agent, with headquarters at Dallas, Tex., succeeding **D. R. Alexander**, who has been promoted to general freight and passenger agent, with headquarters at Kansas City, Mo. Mr. Alexander succeeds **K. T. Mindemann**, who has been advanced to general agent, with headquarters at Milwaukee, Wis., relieving **M. R. Bryan**, who has been appointed general agent, freight department, at Chicago, succeeding Mr. Pollock.

J. R. Frisk, traffic agent of the Union Pacific, with headquarters at Cleveland, Ohio, has been promoted to general agent, freight department, with headquarters at Omaha, Neb., succeeding **R. T. Payne**, who has been transferred to Washington, D. C., relieving **G. F. Allen**, who has been transferred to San Francisco, Calif., succeeding **J. L. Totten**, who has retired.

H. A. Lawrence, general agent, passenger department, of the Union Pacific, with headquarters at New York, has been promoted to traffic manager, with headquarters at Denver, Colo., succeeding **W. T. Price**, whose transfer to Los Angeles, Calif., is reported elsewhere in these columns. **C. H. Saltmarsh**, assistant general passenger agent at Los Angeles, has been appointed general agent, passenger department, with headquarters at New York, replacing Mr. Lawrence, and **C. F. Farmer**, general agent, passenger department, has been promoted to assistant general passenger agent, with headquarters as before at Los Angeles, relieving Mr. Saltmarsh.

J. T. Garrigues, general agent of the Kansas City Southern and the Louisiana & Arkansas, with headquarters at Kansas City, Mo., has been promoted to general

coal agent of both roads with the same headquarters. **Paul C. Brown**, general agent at San Francisco, Calif., has been transferred to Kansas City, succeeding Mr. Garrigues, and **Howard L. Hale**, formerly general agent of the St. Louis-San Francisco (Frisco), with headquarters at Houston, Tex., has been appointed western general agent of the Kansas City Southern and the Louisiana & Arkansas at San Francisco, replacing Mr. Brown. The title of general agent at that point has been abolished. **Ray Henry**, assistant coal traffic manager of both roads, has been appointed assistant general coal agent, with headquarters as before at Kansas City.

Dudley L. Thornbury, assistant traffic manager of the Atchison, Topeka & Santa Fe, with headquarters at Detroit, Mich., has been promoted to New England traffic manager, with headquarters at Boston, Mass. **Matthew A. Murphy**, general freight agent of the Panhandle & Santa Fe (part of the Santa Fe System), with headquarters at Amarillo, Tex., has been advanced to assistant traffic manager of the Santa Fe at Detroit, succeeding Mr. Thornbury. Mr. Murphy was born at Pittsburgh, Pa., on August 6, 1902, and entered rail-



Matthew A. Murphy

way service in 1925 in the passenger department of the Santa Fe, with headquarters at Detroit, later serving in the office of the general freight agent at that point. In 1935 he was advanced to city freight agent, with headquarters at Peoria, Ill., and in 1937 he was promoted to traveling freight agent, with headquarters at Boston, later being further advanced to general agent at Minneapolis, Minn. In October, 1943, Mr. Murphy was promoted to the position he held at the time of his new appointment.

ENGINEERING & SIGNALING

G. L. Brown, roadmaster of the Missouri Pacific, with headquarters at Poplar Bluff, Mo., has been promoted to division engineer of the Joplin-White River divisions, with headquarters at Nevada, Mo., succeeding **W. Rambo**, who has been transferred to the Omaha-Northern Kansas divisions, with headquarters at Falls City, Neb., replacing **J. H. McFadden**, assigned to other duties.

Paul B. Burley, assistant engineer in the office of the general superintendent of

telegraph and signals of the Illinois Central, with headquarters at Chicago, has been promoted to electronics engineer, with the same headquarters, a newly-created position. Mr. Burley was born at Chicago on May 28, 1898, and graduated from the University of Illinois in 1921. He entered rail-



Paul B. Burley

way service in February of that year as a computer of the Illinois Central at Chicago, and a short time later he was advanced to junior engineer of the Chicago Terminal improvement department, with the same headquarters. In 1926 Mr. Burley advanced to supervisor of electrical maintenance, Chicago Terminal district, and five years later he was promoted to the position he held at the time of his new appointment.

Ernest A. Dahl has been appointed electronics engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, a newly-created position. Mr. Dahl was born at Hinsdale, Ill., on October 18, 1919, and attended the Morgan Park Military Academy, Armour Institute and Illinois Tech. He served in the Enlisted Reserve Corps of the U. S. Army and later became an instructor of radar and electronics of the Signal Corps, with headquarters at Camp Mc-



Ernest A. Dahl

Dowell, Naperville, Ill. Mr. Dahl subsequently went with the Western Electric Company where he was employed in setting up facilities for training in high frequency and radar, remaining with that organization until his new appointment, which became effective on April 1.

J. T. Derrig, acting assistant chief engineer of the Northern Pacific, Lines West of Garrison, Mont., with headquarters at Seattle, Wash., has been promoted to assistant chief engineer, with the same headquarters, succeeding **A. F. Stotler**, who has been on leave of absence because of illness. Mr. Stotler has been appointed advisory engineer, with headquarters at Seattle. **H. R. Peterson**, office engineer, with headquarters at St. Paul, Minn., has been advanced to principal assistant engineer, with the same headquarters, and **J. E. Hoving**, assistant engineer at Duluth, Minn., has been promoted to office engineer, with headquarters at St. Paul, succeeding Mr. Peterson.

A new engineering district has been created by the Northern Pacific at Livingston, Mont., and the district engineers and their jurisdictions will be as follows: **H. F. Brown**, lines east of Mandan, N. D., with headquarters as before at St. Paul, Minn.; **H. M. Tremaine**, lines Garrison, Mont., to Yakima, Wash., with headquarters as before at Spokane, Wash.; **G. I. Hayward**, lines west of Yakima, Wash., with headquarters as before at Seattle, Wash., and **V. A. Bennett**, lines Mandan to Garrison, with headquarters at Livingston. Assistant engineers in charge of an operating division will hereafter be designated as division engineers.

OBITUARY

Delos S. Watkins, who retired in 1926 as superintendent of shops of the Southern Pacific, with headquarters at Sacramento, Calif., died at his home in Lodi, Calif., on April 3.

George S. Eagleton, freight claim agent of the Union Pacific, with headquarters at Portland, Ore., died in a hospital in that city on April 12.

Frederick Willis Nichols, who retired in 1929 as auditor of revenue of the Long Island, died on April 15 at a New York hospital. He was 80 years old.

Juan Jose Franco, assistant general manager of the National Railway of Mexico, with headquarters at Mexico City, died suddenly at his home in that city on April 16 following a heart attack. Mr. Franco was born at Zacatecas, Zac, Mex., on September 30, 1882, and entered railway service in 1897 as a telegraph operator of the National Railways of Mexico. He subsequently served as station agent, train dispatcher, chief telegraph operator, brakeman and conductor until 1916, when he was promoted to trainmaster. From 1919 to 1925, Mr. Franco served as division superintendent and in the latter year he was advanced to general superintendent of transportation, with headquarters at Mexico City. When the government took over management of the railroads, Mr. Franco resigned to take charge of railway operations for a large American mining company. In December, 1942, he returned to the National Railways of Mexico as general superintendent of transportation, and in February, 1943, he was promoted to the position he held at the time of his death. Mr. Franco was long active in the American Association of Railroad Superintendents, and served that organization as president in 1930.

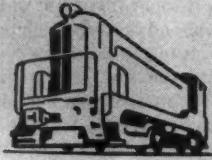
BALDWIN

SERVES THE

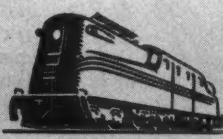
Railroads

Freight and passenger traffic without equal in transportation history—that is the railroad story for 1943 and the first quarter of 1944. This period has witnessed the greatest average daily car movement, highest average car loadings, longest average hauls, and the lowest unserviceable equipment inventories.

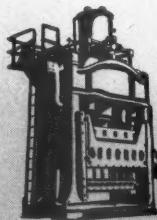
Baldwin steam, electric and diesel-electric locomotives are helping to make these records on the rails. Baldwin hydraulic presses, testing equipment, steel forgings and special railroad shop tools are helping with the maintenance problem. The Baldwin Locomotive Works, Philadelphia, Pa., U.S.A. Offices: Philadelphia, New York, Boston, Washington, Cleveland, St. Louis, Chicago, Houston, San Francisco.



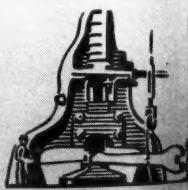
DIESEL-ELECTRIC LOCOMOTIVES



ELECTRIC LOCOMOTIVES



HYDRAULIC PRESSES

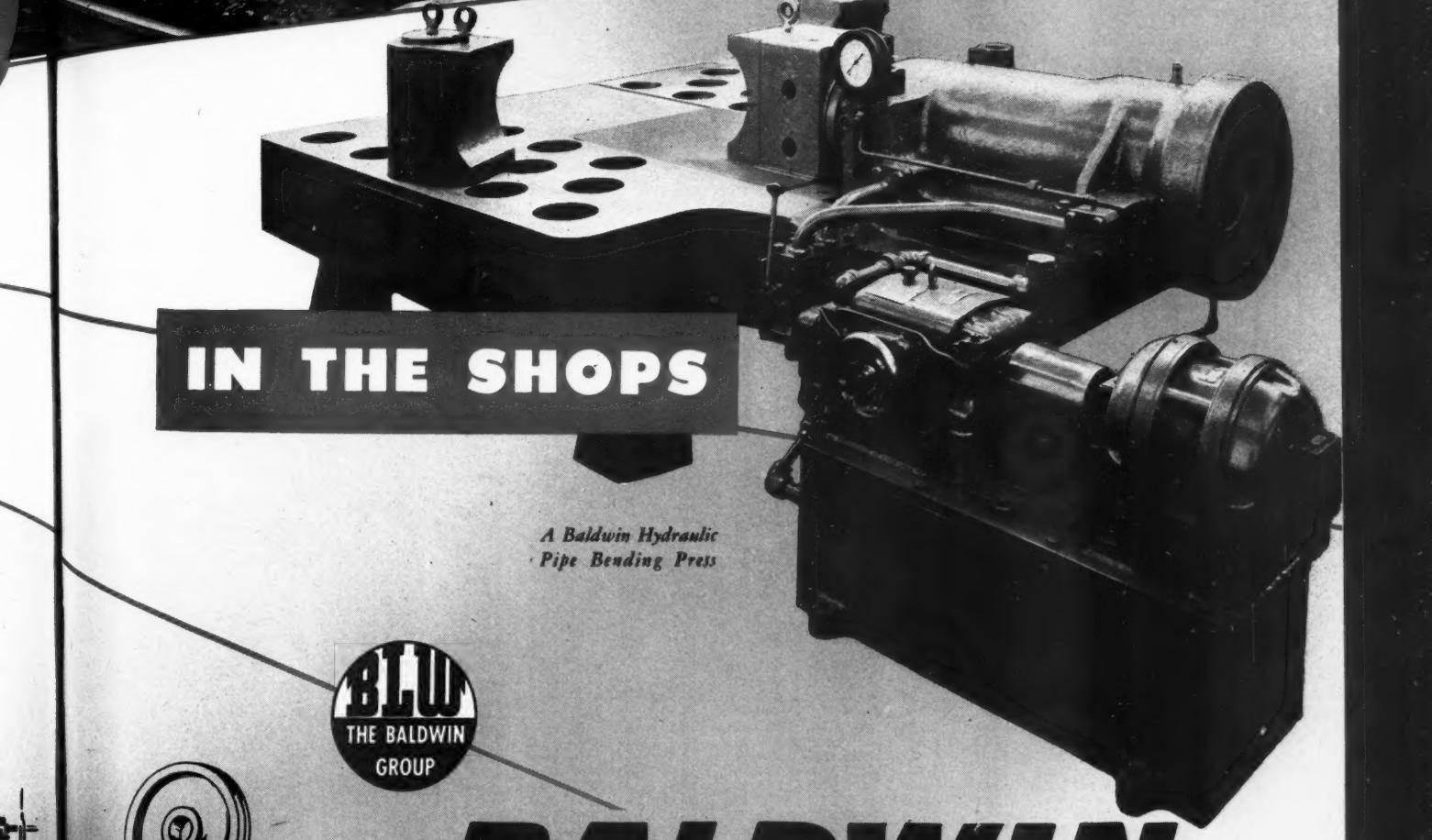


STEEL FORGINGS

BALDWIN PRODUCTS FOR THE RAILROADS: Steam, diesel-electric and electric locomotives, Diesel engines, Hydraulic presses, Special railroad shop equipment, Testing machines and instruments, Steel tires and rolled steel wheels, Crane wheels, Connecting rods and other steel forgings, Steel castings, Springs, Metal plate fabrication, Boilers, Non-ferrous castings, Bending rolls, Plate planers, Dynamometer cars.



ON THE RAILS



IN THE SHOPS

*A Baldwin Hydraulic
Pipe Bending Press*



BALDWIN

The Baldwin Locomotive Works, Philadelphia, Pennsylvania: Locomotive & Ordnance Division; Baldwin Southwark Division; Cramp Brass and Iron Foundries Division; Standard Steel Works Division; Baldwin De La Vergne Sales Corp.; The Whitcomb Locomotive Co.; The Pelton Water Wheel Co.; The Midvale Co.



ROLLED STEEL WHEELS

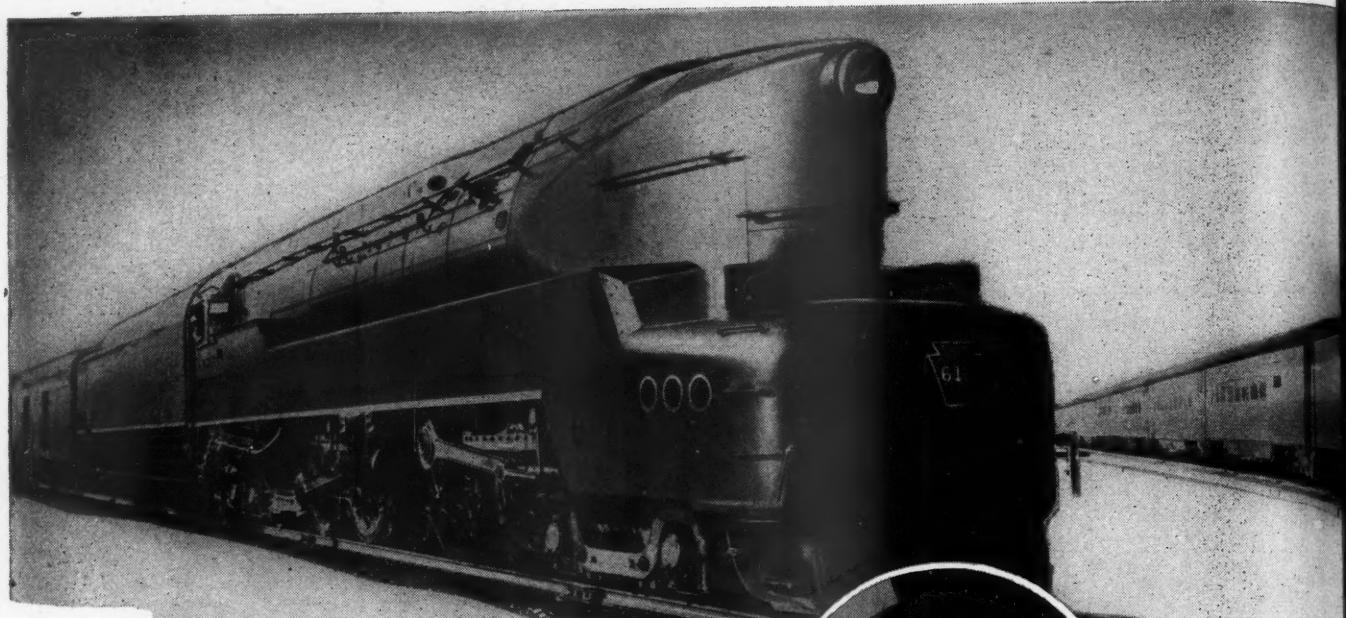
BALDWIN SERVES THE NATION WHICH THE RAILROADS HELPED TO BUILD

Freight Operating Statistics of Large Steam Railways—Selected

	Miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Road locos. on line				
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross excl. locos. & tenders	Net- rev. and non-rev.	Serviceable	Unstored	Stored	B. O.	Per cent B. O.
Region, road, and year													
New England Region:													
Boston & Albany.....	1944	362	157,893	195,592	35,165	3,974	63.4	261,138	110,368	83	..	10	10.8
	1943	362	159,753	192,625	35,179	3,713	60.6	255,600	107,837	81	..	13	13.8
Boston & Maine.....	1944	1,807	407,314	473,425	51,528	14,056	65.8	925,951	402,094	154	..	20	11.5
	1943	1,812	435,788	513,791	57,146	13,165	63.7	914,264	409,889	159	..	18	10.2
N. Y., New H. & Hartf.**.....	1944	1,815	543,933	654,805	61,799	19,269	65.7	1,226,238	534,784	222	1	42	18.5
	1943	1,816	485,891	606,218	58,305	16,474	66.8	1,053,619	473,441	230	11	26	15.2
Great Lakes Region:													
Delaware & Hudson.....	1944	848	349,113	436,175	41,635	14,818	66.1	1,061,914	553,942	145	37	36	16.5
	1943	848	333,963	400,392	40,373	11,738	62.5	874,035	449,201	151	38	35	15.6
Del., Lack. & Western.....	1944	971	379,993	450,353	80,015	16,413	67.7	1,101,797	520,037	156	16	28	14.0
	1943	982	408,747	496,859	77,910	15,519	63.7	1,075,809	495,992	152	4	36	18.8
Erie.....	1944	2,244	1,103,672	1,195,313	92,739	49,147	64.3	3,287,322	1,440,973	321	..	76	19.1
	1943	2,242	984,740	1,068,257	81,501	41,027	65.5	2,730,355	1,243,454	303	7	77	19.9
Grand Trunk Western.....	1944	1,026	295,353	312,776	2,853	9,073	65.5	603,312	270,708	68	1	11	13.8
	1943	1,026	296,853	306,720	3,344	8,705	64.1	590,911	262,700	71	2	9	11.0
Lehigh Valley.....	1944	1,247	565,799	627,491	91,674	23,063	62.4	1,633,286	775,894	151	..	16	9.6
	1943	1,248	476,157	520,874	74,517	18,639	60.7	1,343,154	632,801	143	..	14	8.9
New York Central.....	1944	10,325	3,872,262	4,180,660	268,634	141,055	60.8	10,126,181	4,659,309	1,179	6	239	16.8
	1943	10,425	3,826,455	4,159,708	268,020	132,294	60.0	9,745,951	4,539,387	1,194	17	215	15.1
New York, Chi. & St. L.	1944	1,657	898,481	915,341	11,470	3,708	65.4	2,228,096	1,004,968	170	..	13	7.1
	1943	1,657	914,189	924,879	11,620	3,1768	61.0	2,371,219	1,013,192	167	..	14	7.7
Pere Marquette.....	1944	1,945	468,126	484,831	11,074	14,674	65.6	1,015,020	487,389	140	..	23	14.1
	1943	1,998	486,161	515,516	12,813	13,595	63.3	963,340	453,226	141	3	19	11.7
Pitts. & Lake Erie.....	1944	229	97,173	102,066	10	4,005	61.6	348,102	200,490	29	..	14	32.6
	1943	233	100,600	104,748	..	4,142	63.4	364,639	216,344	38	..	11	20.4
Wabash.....	1944	2,381	768,732	795,828	18,908	27,884	70.0	1,821,314	858,250	174	8	40	18.0
	1943	2,381	750,263	775,189	17,233	24,743	63.5	1,713,465	774,741	182	9	34	15.1
Central Eastern Region:													
Baltimore & Ohio.....	1944	6,109	2,473,517	3,039,138	306,645	80,498	61.8	5,862,148	2,836,799	938	2	198	17.4
	1943	6,116	2,442,192	2,998,687	352,549	73,858	60.8	5,499,053	2,645,277	919	..	203	18.0
Central of New Jersey**.....	1944	655	241,589	283,023	62,586	8,599	60.2	634,078	314,431	135	4	15	9.7
	1943	657	269,223	309,433	60,083	7,967	57.8	606,793	299,797	128	8	17	11.1
Chicago & Eastern Ill.	1944	912	317,013	324,636	10,672	9,133	57.8	666,979	297,550	79	..	7	8.1
	1943	912	271,409	293,583	10,525	8,279	62.8	579,396	268,453	65	..	11	14.5
Elgin, Joliet & Eastern.....	1944	392	137,474	141,223	3,245	3,790	65.2	301,223	164,284	63	..	13	17.1
	1943	392	146,723	149,583	2,685	3,721	62.6	301,528	161,267	71	..	8	10.1
Long Island.....	1944	372	35,734	37,288	15,235	396	57.1	29,099	12,263	42	..	8	16.0
	1943	374	31,236	32,690	20,313	309	53.7	24,093	9,885	45	..	3	6.3
Pennsylvania System.....	1944	9,893	4,966,456	5,818,604	770,092	182,190	60.8	13,330,588	6,326,582	2,039	..	175	7.9
	1943	9,942	4,647,720	5,485,229	753,038	157,630	60.0	11,649,850	5,539,298	1,965	..	164	7.7
Reading.....	1944	1,416	593,545	671,084	89,776	19,404	64.5	1,488,703	806,121	289	8	44	12.9
	1943	1,419	631,304	703,336	85,960	18,669	60.2	1,496,856	799,392	288	8	29	8.9
Pocahontas Region:													
Chesapeake & Ohio.....	1944	3,032	1,184,123	1,293,617	62,597	50,514	56.3	4,400,122	2,501,887	456	..	65	12.5
	1943	3,034	1,066,352	1,152,557	56,040	44,719	56.7	3,853,843	2,162,044	443	..	70	13.6
Norfolk & Western.....	1944	2,132	865,062	948,026	80,701	37,436	58.2	3,304,441	1,803,703	302	8	18	5.5
	1943	2,134	840,728	912,103	75,752	35,356	58.0	3,096,738	1,688,983	297	10	27	8.1
Southern Region:													
Atlantic Coast Line.....	1944	4,953	1,098,608	1,123,713	15,625	29,971	63.5	2,011,459	886,644	369	..	26	6.6
	1943	4,982	1,121,433	1,157,969	16,868	29,635	62.8	2,038,113	909,947	354	8	21	5.5
Central of Georgia**.....	1944	1,783	375,111	390,261	6,704	9,057	68.5	605,667	285,801	99	..	10	9.2
	1943	1,783	314,822	320,604	5,438	6,969	69.4	468,238	217,854	107	..	9	7.8
Gulf, Mobile & Ohio.....	1944	1,962	284,092	352,102	1,043	9,629	75.1	611,357	301,584	110	..	10	8.3
	1943	1,962	387,032	479,853	7,207	11,974	69.2	812,087	400,769	118	..	5	4.1
Illinois Central (incl. Yazoo & Miss. Vy.).....	1944	6,347	1,809,566	1,826,393	33,968	68,045	62.8	4,826,400	2,276,821	659	1	47	6.6
	1943	6,365	1,915,540	1,937,561	40,100	65,276	60.0	4,830,412	2,267,250	627	..	70	10.0
Louisville & Nashville.....	1944	4,736	1,670,637	1,819,258	50,144	41,544	63.4	2,984,412	1,517,407	427	4	55	11.3
	1943	4,735	1,622,848	1,769,038	45,128	37,361	61.6	2,780,595	1,415,764	429	1	58	11.9
Seaboard Air Line*.....	1944	4,165	1,002,351	1,189,025	15,356	37,144	65.5	1,845,239	811,612	313	..	40	11.3
	1943	4,171	1,024,781	1,130,652	12,917	25,462	65.8	1,762,246	799,471	306	..	21	6.4
Southern.....	1944	6,479	2,282,609	2,333,743	36,400	51,207	68.1	3,325,979	1,533,083	604	..	82	12.0
	1943	6,478	2,159,367	2,206,426	31,882	44,918	66.1	3,013,107	1,381,531	602	..	62	9.3
Northwestern Region:													
Chi. & North Western**.....	1944	8,098	1,119,550	1,177,574	24,013	34,916	67.0	2,368,398	1,134,770	388	22	91	18.2
	1943	8,098	1,029,926	1,077,231	24,483	29,087	64.6	2,041,474	916,240	398	36	63	12.7
Chicago Great Western.....	1944	1,445	302,628	309,650	12,611	9,365	68.7	630,320	286,062	73	..	7	8.8
	1943	1,447	286,370	293,066	9,461	7,978	68.4	538,309	243,409	75	..	7	8.5
Chi., Milw., St. P. & Pac.**.....	1944	10,734	1,593,681	1,701,530	74,690	52,628	69.7	3,505,552	1,712,090	520	31	85	13.4
	1943	10,806	1,567,107	1,674,735	76,826	44,780	67.1	3,107,208	1,511,670	526	29	57	9.3
Chi., St. P., Minneap. & Om.	1944	1,606	237,146	254,377	15,228	6,182	66.8	432,797	201,248	96	28	9	6.8
	1943	1,618	236,833	257,624	13,946	5,302	65.1	377,152	175,115	109	14	5	3.9
Duluth, Missabe & I. R.	1944	544	29,201	29,282	285	516	59.9	33,147	15,920	25	6	20	39.2
	1943	545	26,934	27,470	679	406	63.9	25,582	12,137	26	9	16	31.4
Great Northern.....	1944	8,278	1,224,337	1,225,852	52,344	42,560	71.4	2,888,077	1,427,353	401	14	66	13.7
	1943	8,022	1,090,131	1,090,291	38,277	33,344	72.4	2,260,714	1,117,933	405	12	75	15.2

Items for the month of January, 1944, Compared with January, 1943

Region, road, and year	Freight cars on line			Per Cent B. O.	G.t.m. per train-hr. excl. locos. and tenders	G.t.m. per train-mi. excl. locos. and tenders	Net ton-mi. per train- mile	Net ton-mi. per car- mile	Net ton-mi. per car- day	Car miles per car- day	Net daily ton-mi. per road-mi.	Coal lb. per 1000 g.t.m. inc. loco.	Mi. per loco. per day	
	Home	Foreign	Total											
New England Region:														
Boston & Albany.....	1944	315	5,981	6,296	0.3	22,500	1,659	701	27.8	500	28.4	9,835	224	88.7
	1943	344	4,998	5,342	.4	23,298	1,606	678	29.0	649	36.8	9,609	193	87.7
Boston & Maine.....	1944	1,899	9,771	11,670	2.0	34,056	2,281	990	28.6	1,046	55.6	7,178	90	101.9
	1943	2,871	11,809	14,680	2.1	29,877	2,109	946	31.1	925	46.6	7,297	116	107.7
N. Y., New H. & Hartf.**.....	1944	3,118	22,492	25,610	2.5	32,352	2,289	998	27.8	676	37.1	9,505	113	91.1
	1943	3,634	19,693	23,327	1.4	31,176	2,205	991	28.7	680	35.4	8,410	114	85.4
Great Lakes Region:														
Delaware & Hudson.....	1944	3,422	6,828	10,250	1.8	49,158	3,057	1,595	37.4	1,824	73.8	21,072	115	73.1
	1943	5,112	4,823	9,935	4.2	42,218	2,628	1,351	38.3	1,447	60.5	17,088	119	67.2
Del., Lack. & Western.....	1944	5,518	14,458	19,976	2.5	40,639	2,929	1,383	31.7	871	40.6	17,276	132	92.3
Erie.....	1944	7,440	11,037	18,477	2.5	38,644	2,678	1,235	32.0	860	42.2	16,293	131	106.7
Erie.....	1943	11,175	29,400	40,575	2.3	49,063	2,993	1,312	29.3	1,166	61.8	20,714	104	111.4
Grand Trunk Western.....	1944	1,906	5,725	7,631	4.2	43,125	2,052	921	29.8	1,121	57.4	8,511	85	132.4
	1943	2,359	8,048	10,407	2.7	40,203	2,006	892	30.2	865	44.7	8,259	89	132.4
Lehigh Valley.....	1944	6,873	22,866	29,739	1.7	45,263	3,000	1,425	33.6	877	41.8	20,071	121	145.2
	1943	8,625	20,039	28,664	1.8	43,374	2,923	1,377	34.0	732	35.5	16,357	126	129.0
New York Central.....	1944	46,043	106,640	152,683	2.2	38,766	2,648	1,218	33.0	932	46.4	14,557	113	111.1
	1943	56,422	92,377	148,799	2.8	38,682	2,581	1,202	34.3	1,002	48.7	14,046	111	111.4
New York, Chi. & St. L.	1944	2,765	14,033	16,798	1.8	44,369	2,493	1,125	29.8	2,006	103.0	19,564	94	173.5
Pere Marquette.....	1944	2,365	8,903	11,268	2.4	38,242	2,198	1,056	33.2	1,474	67.7	8,083	98	102.9
Pitts. & Lake Erie.....	1944	3,842	8,827	12,669	2.5	32,905	2,029	954	33.3	1,189	56.4	7,317	103	112.5
	1943	3,698	9,489	13,187	3.6	46,738	3,588	2,066	50.1	528	17.1	28,242	103	83.8
Wabash.....	1944	4,966	7,955	12,921	4.3	46,599	3,639	2,159	52.2	550	16.6	29,952	92	68.9
	1943	5,958	14,913	20,871	1.5	45,708	2,396	1,129	30.8	1,435	66.6	11,628	113	122.8
	1943	7,619	13,020	20,639	1.2	42,101	2,313	1,046	31.3	1,180	59.3	10,496	125	118.3
Central Eastern Region:														
Baltimore & Ohio.....	1944	36,219	58,873	95,092	2.3	29,364	2,428	1,175	35.2	969	44.5	14,979	162	98.6
	1943	43,024	46,454	89,478	2.5	28,670	2,303	1,108	35.8	945	43.4	13,952	159	100.2
Central of New Jersey**.....	1944	4,470	24,363	28,833	1.4	26,607	2,656	1,317	36.6	368	16.7	15,485	155	97.3
	1943	7,514	18,160	25,674	.9	27,620	2,291	1,132	37.6	371	17.1	14,720	151	103.2
Chicago & Eastern Ill.	1944	1,911	5,472	7,383	2.6	35,119	2,168	967	32.6	1,245	66.1	10,525	125	129.4
	1943	2,106	5,141	7,247	3.1	33,940	2,228	1,032	32.4	1,221	60.0	9,495	131	134.8
Elgin, Joliet & Eastern.....	1944	9,073	7,016	16,089	3.3	17,298	2,310	1,260	43.3	333	11.8	13,519	143	91.7
	1943	8,799	7,715	16,514	3.6	16,094	2,145	1,147	43.3	299	11.0	13,271	159	94.8
Long Island.....	1944	21	5,195	5,216	.5	6,659	839	353	31.0	81	4.6	1,063	350	48.3
	1943	29	3,881	3,910	.3	6,253	786	322	32.0	83	4.8	853	387	47.1
Pennsylvania System.....	1944	115,673	137,268	252,941	2.6	33,354	2,777	1,318	34.7	812	38.5	20,629	140	104.7
	1943	141,748	120,173	261,921	2.2	31,603	2,580	1,227	35.1	697	33.1	17,973	138	102.9
Reading.....	1944	12,105	32,772	44,877	1.4	27,897	2,515	1,362	41.5	616	23.0	18,364	134	85.2
	1943	17,108	21,544	38,652	2.8	29,364	2,377	1,269	42.8	682	26.5	18,173	128	87.9
Pocahontas Region:														
Chesapeake & Ohio.....	1944	34,177	15,867	50,044	1.0	51,662	3,780	2,149	49.5	1,621	58.2	26,618	90	91.1
	1943	35,230	14,669	49,899	1.6	51,000	3,676	2,062	48.3	1,444	52.6	22,987	86	83.2
Norfolk & Western.....	1944	28,956	7,370	36,326	1.4	59,180	3,894	2,126	48.2	1,500	53.5	27,291	101	108.3
	1943	30,955	6,901	37,856	2.2	56,525	3,763	2,052	47.8	1,397	50.4	25,531	101	102.9
Southern Region:														
Atlantic Coast Line.....	1944	8,233	21,861	30,094	2.9	28,856	1,845	813	29.6	930	49.6	5,775	118	99.0
	1943	9,067	23,416	32,483	2.8	28,924	1,825	815	30.7	949	49.2	5,892	109	105.9
Central of Georgia**.....	1944	1,724	7,171	8,895	.7	29,834	1,630	769	31.6	1,086	50.3	5,171	130	122.6
	1943	2,333	6,018	8,351	.9	26,612	1,503	699	31.3	870	40.1	3,941	125	97.9
Gulf, Mobile & Ohio.....	1944	2,120	6,759	8,879	1.2	38,409	2,156	1,063	33.5	1,452	62.3	6,589	120	133.3
	1943	2,713	6,153	8,866	1.2	38,295	2,122	1,047	33.5	1,452	62.3	6,589	120	133.3
Illinois Central (incl. Y. & Miss. V.).....	1944	18,501	33,559	52,060	.8	44,091	2,729	1,287	33.5	1,377	65.5	11,572	125	89.3
	1943	20,613	31,891	52,504	1.0	40,207	2,571	1,207	34.7	1,374	65.9	11,491	124	96.4
Louisville & Nashville.....	1944	29,287	15,763	45,052	2.0	26,887	1,786	908	36.5	1,059	45.8	10,335	141	129.7
	1943	30,224	16,970	47,194	2.0	26,103	1,713	872	37.9	937	40.1	9,645	134	126.7
Seaboard Air Line*.....	1944	6,272	20,950	27,222	1.5	29,743	1,881	827	29.9	947	48.4	6,286	139	120.1
	1943	8,074	20,231	28,305	1.6	26,965	1,771	803	31.4	942	45.6	6,183	128	124.7
Southern.....	1944	15,989	32,481	48,470	1.8	24,666	1,482	683	29.9	1,048	51.4	7,633	153	116.0
	1943	18,861	30,309	49,170	1.7	23,422	1,424	653	30.8	901	44.3	6,880	152	113.4
Northwestern Region:														
Chi. & North Western**.....	1944	20,443	31,101	51,544	4.0	33,674	2,188	1,048	32.5	691	31.7	4,520	136	82.7
	1943	22,721	30,860	53,581	4.1	30,022	2,044	917	31.5	539	26.5	3,650	148	76.7
Chicago Great Western.....	1944	1,082	4,620	5,702	1.0	36,741	2,092	950	30.5	1,642	78.2	6,386	132	136.4
	1943	1,349	4,698	6,047	1.6	32,393	1,883	852	30.5	1,385	66.4	5,426	143	126.0
Chi., Milw., St. P. & Pac.**.....	1944	23,367	31,982	55,349	1.3	34,662	2,215	1,082	32.5	1,045	56.1	5,145	129	97.1
	1943	28,585	25,927	54,512	2.0	30,279	1,999	973	33.8	908	40.1	4,513	143	98.4
Chi., St. P., Minnep. & Om.	1944	1,000	7,364	8,364	3.9	27,309	1,880	755	33.0	649	30.2	3,491	131	70.1
	1943	1,493	6,859	8,352	6.4	21,011	1,625	575	30.9	33	1.8	944	197	24.3
Duluth, Missabe & I. R.	1944	15,065	594	15,659	2.9	15,101	1,197	872	29.6	29	26	1,318	211	24.5
	1943	14,711	582	15,293	2.5	14,196	987	468	29.9	26	1.3	718	211	24.5
Great Northern.....	1944	21,337	16,748	38,085	2.3	36,634	2,							



FLANNERY BOLT CO.



Guard the
**PROFIT PAYING
STREAMLINERS**

THE COMPANY

BRIDGEVILLE, PENNSYLVANIA

Operating Revenues and Operating Expenses of Class I Steam Railways

Compiled from 132 monthly reports of revenues and expenses representing 135 Class I steam railways
(Switching and Terminal Companies Not Included)

FOR THE MONTH OF FEBRUARY, 1944 AND 1943

Item	United States		Eastern District		Southern District		Western District	
	1944	1943	1944	1943	1944	1943	1944	1943
Miles of road operated at close of month	228,786	229,263	56,112	56,379	43,387	43,473	129,279	129,411
Revenues:								
Freight	\$551,441,956	\$513,140,140	\$214,804,764	\$200,275,117	\$109,316,903	\$103,582,249	\$227,320,289	\$209,282,774
Passenger	135,881,229	107,223,222	53,437,198	42,811,819	28,390,195	23,540,828	54,053,836	40,870,375
Mail	9,816,205	9,138,188	3,315,100	3,131,461	1,826,415	1,627,538	4,674,690	4,379,189
Express	10,952,735	8,640,782	3,270,724	3,055,282	1,927,045	1,451,586	5,754,966	4,133,914
All other operating revenues	27,213,340	25,336,888	11,550,818	10,809,660	4,018,195	3,678,433	11,644,327	10,848,795
Railway operating revenues	735,305,465	663,479,220	286,378,604	260,083,339	145,478,753	133,880,634	303,448,108	269,515,247
Expenses:								
Maintenance of way and structures	90,674,881	72,033,235	34,730,698	27,831,496	16,114,383	13,684,027	39,829,800	30,517,712
Depreciation	8,815,835	8,826,198	3,811,227	3,781,912	1,458,898	1,480,852	3,545,710	3,563,434
Retirements	565,977	122,843	219,952	36,746	84,768	30,952	261,257	55,145
Deferred maintenance	327,886	48,362	23,337	—	—	—	304,549	48,362
Amortization of defense projects	1,333,389	631,369	457,379	183,034	236,426	110,135	639,584	338,200
Equalization	5,484,310	5,409,392	3,060,844	2,738,224	833,668	1,500,188	1,589,798	1,170,980
All other	74,803,256	56,995,071	27,204,633	21,091,580	13,500,623	10,561,900	34,098,000	25,341,591
Maintenance of equipment	125,375,675	105,112,358	52,635,252	45,704,238	23,697,542	19,600,272	49,042,881	39,807,848
Depreciation	17,495,824	17,405,879	7,338,531	7,227,664	3,509,077	3,546,074	6,648,216	6,632,141
Extraordinary retirements	—	—	—	—	—	—	—	—
Deferred maintenance and major repairs	71,118	199,953	8,000	—	—	3,646	79,118	203,599
Amortization of defense projects	13,107,902	9,847,611	4,390,634	3,952,380	3,624,731	2,405,848	5,092,537	3,489,383
Equalization	197,290	127,209	3,105	4,138	153,703	87,092	46,692	35,979
All other	94,645,777	77,531,706	40,901,192	34,520,056	16,410,031	13,564,904	37,334,554	29,446,746
Traffic	10,738,990	9,977,310	3,780,823	3,668,654	2,120,915	1,954,879	4,837,252	4,353,777
Transportation—Rail line	239,281,828	199,589,482	108,851,379	91,601,148	40,362,730	34,180,320	90,067,719	73,808,014
Transportation—Water line	276	277	—	—	—	—	276	277
Miscellaneous operations	9,325,439	7,673,088	3,379,830	2,811,024	1,479,993	1,319,207	4,465,616	3,542,857
General	16,697,295	14,047,694	6,844,833	5,864,989	3,466,520	2,679,697	6,385,942	5,503,008
Railway operating expenses	492,093,832	408,432,890	210,222,815	177,481,549	87,242,083	73,418,402	194,628,934	157,532,939
Net revenue from railway operations	243,211,633	255,046,330	76,155,789	82,601,790	58,236,670	60,462,232	108,819,174	111,982,308
Railway tax accruals	143,723,314	133,612,098	40,205,865	41,752,302	36,215,890	35,033,048	67,301,559	56,826,748
Pay-roll taxes	18,322,814	15,117,509	7,940,706	6,575,846	3,185,714	2,631,598	7,196,394	5,910,065
Federal income taxes†	101,218,644	95,149,451	22,263,587	25,099,394	28,017,914	27,440,524	50,937,143	42,609,533
All other taxes	24,181,856	23,345,138	10,001,572	10,077,062	5,012,262	4,960,926	9,168,022	8,307,150
Railway operating income	99,488,319	121,244,232	35,949,924	40,849,488	22,020,780	25,429,184	41,517,615	55,155,560
Equipment rents—Dr. balance	11,678,819	12,345,085	5,815,616	5,229,976	607,784	975,604	5,255,419	6,139,505
Joint facility rent—Dr. balance	3,316,321	3,254,900	1,591,425	1,579,800	389,707	416,557	1,335,189	1,258,543
Net railway operating income..	84,493,179	105,834,247	28,542,883	34,039,712	21,023,289	24,037,023	34,927,007	47,757,512
Ratio of expenses to revenues (per cent)	66.9	61.6	73.4	68.2	60.0	54.8	64.1	58.5

FOR TWO MONTHS ENDED WITH FEBRUARY, 1944 AND 1943

Item	228,786	229,321	56,117	56,396	43,387	43,484	129,282	129,441
Miles of road operated at close of month	228,786	229,321	56,117	56,396	43,387	43,484	129,282	129,441
Revenues:								
Freight	\$1,099,860,765	\$1,027,448,718	\$427,529,140	\$401,391,049	\$217,946,079	\$210,513,057	\$454,385,546	\$415,544,612
Passenger	275,996,016	218,947,146	108,348,213	88,877,082	57,280,107	46,712,259	110,367,696	83,357,805
Mail	20,144,663	18,799,423	6,727,947	6,527,795	3,727,869	3,368,481	9,688,847	8,903,147
Express	24,201,668	17,597,094	7,927,071	6,328,505	4,075,338	3,005,459	12,199,259	8,263,126
All other operating revenues	55,774,084	52,009,677	24,221,632	22,842,510	8,137,781	7,223,456	23,414,671	21,943,711
Railway operating revenues	1,475,977,196	1,334,802,058	574,754,003	525,966,945	291,167,174	270,822,712	610,056,019	538,012,401
Expenses:								
Maintenance of way and structures	180,178,132	245,063,695	69,492,019	57,109,617	32,162,859	27,620,741	78,523,254	60,333,337
Depreciation	17,628,210	17,710,966	7,618,434	7,593,843	2,918,526	2,962,289	7,091,250	7,154,834
Retirements	1,037,050	129,174	423,991	62,499	166,682	31,103	446,377	35,572
Deferred maintenance	591,984	77,860	22,133	—	—	—	569,851	77,860
Amortization of defense projects	2,628,698	1,243,779	892,595	362,525	470,245	223,194	1,265,858	658,060
Equalization	11,939,432	11,820,310	6,603,371	5,748,829	1,970,205	3,291,638	3,365,856	2,779,843
All other	147,536,726	114,081,606	53,975,761	43,341,921	26,637,201	21,112,517	66,923,764	49,627,168
Maintenance of equipment	254,555,360	212,842,913	107,274,649	92,536,465	47,383,797	40,016,336	99,896,914	80,290,112
Depreciation	35,288,460	34,974,129	14,820,267	14,598,473	7,130,041	7,094,368	13,338,152	13,281,288
Extraordinary retirements	51,775	156,753	8,000	—	—	8,456	59,775	165,209
Deferred maintenance and major repairs	24,890,645	18,617,091	8,355,494	7,281,383	6,548,356	4,788,449	9,986,795	6,547,259
Amortization of defense projects	214,432	192,965	9,698	15,686	136,474	96,297	68,260	80,984
Equalization	194,213,598	158,901,975	84,081,190	70,640,923	33,568,926	28,045,678	76,563,482	60,215,374
Traffic	21,805,900	20,161,469	7,793,808	7,412,475	4,205,244	3,859,991	9,806,848	8,889,003
Transportation—Rail line	487,531,892	410,237,127	220,804,708	187,097,355	82,576,452	70,260,731	184,150,732	152,879,041
Transportation—Water line	18,856,097	15,932,932	6,824,638	5,819,672	2,995,107	2,693,808	9,036,352	7,419,452
Miscellaneous operations	33,179,525	28,371,798	13,501,396	11,782,897	6,667,029	5,412,956	13,011,100	11,175,945
General	996,106,905	832,611,319	425,691,218	361,758,481	175,990,488	149,864,563	394,425,199	320,988,275
Railway operating expenses	479,870,291	502,190,739	149,062,785	164,208,464	115,176,686	120,958,149	215,630,820	217,024,120
Net revenue from railway operations	282,692,779	260,838,821	79,419,101	82,878,158	71,848,922	69,884,241	131,424,756	108,076,423
Railway tax accruals	37,057,287	30,972,970	15,982,228	13,401,462	6,414,083	5,456,112	14,660,976	12,115,396
Pay-roll taxes	196,985,369	183,079,102	43,232,604	49,333,180	55,289,022	54,361,659	98,463,743	79,384,263
Federal income taxes†	48,650,123	46,786,749	20,204,269	20,143,516	10,143,517	10,066,470	18,300,037	16,576,763
All other taxes	—	—	—	—	—	—	—	—
Railway operating income	197,177,512	241,351,918	69,643,684	81,330,306	43,327,764	51,073,908	84,206,064	108,947,704
Equipment rents—Dr. balance	23,055,838	23,724,349	10,919,214	9,633,485	1,284,120	1,910,420	10,852,504	12,180,444
Joint facility rent—Dr. balance	6,804,579	6,704,178	3,343,360	3,378,194	800,942	834,177	2,660,277	2,491,803
Net railway operating income..	167,317,095	210,923,391	55,381,110	68,318,627	41,242,702	48,329,311	70,693,283	94,275,453
Ratio of expenses to revenues (per cent)	67.5	62.4	74.1	68.8	60.4	55.3	64.7	59.3

* Decrease, deficit, or other reverse items.

† Includes income tax, surtax, and excess-profits tax.

Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.